Sunshine Act Meetings

Federal Register
Vol. 55, No. 201
Wednesday, October 17, 1990

This section of the FEDERAL REGISTER contains notices of meetings published under the "Government in the Sunshine Act" (Pub. L. 94-409) 5 U.S.C. 552b(e)(3).

FEDERAL MINE SAFETY AND HEALTH REVIEW COMMISSION

October 10, 1990.

TIME AND DATE: 10:00 a.m., Thursday, October 18, 1990.

PLACE: Room 600, 1730 K Street, NW., Washington, DC.

STATUS: Closed [Pursuant to 5 U.S.C. § 552b(c)(10)].

MATTERS TO BE CONSIDERED: The Commission will consider and act upon the following:

1. *Secretary of Labor on behalf of Price and Vacha v. Jim Walter Resources,* Docket No. SE 87-128-D (Issues include consideration of Jim Walter Resources' Motion for Reconsideration.)

It was determined by a unanimous vote of Commissioners that this meeting be held in closed session.

CONTACT PERSON FOR MORE INFORMATION: Jean Ellen (202) 653-5629, (202) 708-9300 for TDD Relay, 1-800-877-8339 for Toll Free.

Jean H. Ellen,
Agenda Clerk.
[FR Doc. 90-24552 Filed 10-15-90; 9:45 am]
BILLING CODE 6735-01-M

FEDERAL RESERVE SYSTEM BOARD OF GOVERNORS

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: 55 FR 41308, October 10, 1990.

PREVIOUSLY ANNOUNCED TIME AND DATE OF THE MEETING: 11:00 a.m., Monday, October 15, 1990.

CHANGES IN THE MEETING: Addition of the following closed item(s) to the meeting:

Consideration of issues related to legislative matter. [This item was originally announced for a closed meeting on September 28, 1990.)

CONTACT PERSON FOR MORE INFORMATION: Mr. Joseph R. Coyne, Assistant to the Board, (202) 452-3204.

Dated: October 15, 1990.
Jennifer J. Johnson,
Associate Secretary of the Board.
[FR Doc. 90-24648 Filed 10-15-90; 3:47 pm]
BILLING CODE 6210-01-M

NATIONAL TRANSPORTATION SAFETY BOARD

TIME AND DATE: 9:30 a.m., Tuesday, October 23, 1990.

PLACE: Board Room, Eighth Floor, 800 Independence Avenue, SW., Washington, DC 20594.

STATUS: The first two items are open to the public. The last three items are closed under Exemption 10 of the Government in Sunshine Act.

MATTERS TO BE CONSIDERED:

1. Railroad Accident Report: Collision of Amtrak Passenger Train with Tractor Semitrailer, Stockton, California, December 19, 1989.
2. Recommendations to FAA and NASA: Incidents of NASA Airplanes Descending Through ATC-Assigned Altitudes and Conflicting with Other Aircraft.
3. Opinion and Order: Administrator v. Smith, Docket SE-8577; disposition of respondent's and Administrator's appeals.
4. Opinion and Order: Administrator v. Trockmorton, Docket SE-8808; disposition of appeals of Administrator and respondent.
5. Opinion and Order: Administrator v. Hrobak, Docket SE-8950; disposition of the Administrator's appeal.

New Media Contact: Mike Benson 382-6600.

FOR MORE INFORMATION CONTACT: Bea Hardesty. (202) 382-6525.

Dated: October 12, 1990.
Bea Hardesty,
Federal Register Liaison Officer.
[FR Doc. 90-24553 Filed 10-15-90; 9:45 am]
BILLING CODE 7533-01-M

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES

Meeting Notice

TIME AND DATE: Subcommittee meetings 7:00 p.m., October 28, 1990 Full Board 8:00 a.m., October 29, 1990.

PLACE: Uniformed Services University of the Health Sciences, Room D3-001, 4301 Jones Bridge Road, Bethesda, Maryland 20814-4799.

STATUS: Open—under "Government in the Sunshine Act" (5 U.S.C. 552b(e)(3)).

MATTERS TO BE CONSIDERED:

7:00 p.m. Subcommittee Meetings—Reports on Planning & Oversight
8:00 a.m. Meeting—Board of Regents

(1) Approval of Minutes—September 24, 1990; (2) Faculty Matters; (3) Report—Admissions; (4) Report—Associate Dean for Operations; (5) Report—Dean, Military Medicine Education Institute; (6) Report—Oversight and Planning Committees; (7) Report—President, USUHS; (8) Comments—Members, Board of Regents; (9) Comments—Chairman, Board of Regents

New Business

CONTACT PERSON FOR MORE INFORMATION: Charles R. Mannix, Executive Secretary of the Board of Regents, 202/295-3028.

Dated: December 12, 1990.
L.M. Bynum,
Alternate OSD Federal Register Liaison Officer, Department of Defense.
[FR Doc. 90-24548 Filed 10-15-90; 9:26 am]
BILLING CODE 3810-01-M

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES

Meeting Notice

TIME AND DATE: Executive Committee of the Board of Regents, 8:00 a.m., Monday, October 15, 1990.

PLACE: Uniformed Services University of the Health Sciences, Room D3-001, 4301 Jones Bridge Road, Bethesda, Maryland 20814-4799.

STATUS: Open—under "Government in the Sunshine Act" (5 U.S.C. 552b(e)(3)).

MATTERS TO BE CONSIDERED:

8:00 a.m. Meeting—Executive Committee—Board of Regents

(1) Faculty Matters; (2) Review of University Reorganization Plan; (3) Review of Action Necessary in Event of Financial Exigency; (4) Comments—Chairman, Board of Regents; (5) Comments—Members, Board of Regents.

New Business

CONTACT PERSON FOR MORE INFORMATION: Charles R. Mannix, Executive Secretary of the Board of Regents, 202/295-3028.

Dated: October 12, 1990.
L.M. Bynum,
Alternate OSD Federal Register Liaison Officer, Department of Defense.
[FR Doc. 90-24549 Filed 10-15-90; 8:45 am]
BILLING CODE 3810-01-M

Corrections

Federal Register
Vol. 55, No. 201
Wednesday, October 17, 1990

This section of the FEDERAL REGISTER contains editorial corrections of previously published Presidential, Rule, Proposed Rule, and Notice documents. These corrections are prepared by the Office of the Federal Register. Agency prepared corrections are issued as signed documents and appear in the appropriate document categories elsewhere in the issue.

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Groundfish and Crab Fisheries of the Bering Sea and Aleutian Islands Area, Groundfish Fisheries of the Gulf of Alaska, and Pacific Halibut Fisheries Off the State of Alaska

Correction

In the correction to notice document 90-19964 appearing on page 38004 in the issue of Friday, September 14, 1990, make the following correction:

In the second column, in the fourteenth line, the page number "34725", should read "34726".

BILLING CODE 1505-01-D

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket Nos. EC90-19-000, et al.]

Union Electric Co., et al.; Electric Rate, Small Power Production, and Interlocking Directorate Filings

Correction

In notice document 90-21956 beginning on page 38380 in the issue of Tuesday, September 18, 1990, make the following correction:

In the third column, under "**4. Wisconsin Power and Light Co.**" the docket line should read "[Docket No. ER 90-573-000]".

BILLING CODE 1505-01-D

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket Nos. TQ91-1-63-000 and TM91-1-63-001]

Carnegie Natural Gas Co.; Proposed Changes in FERC Gas Tariff

Correction

In notice document 90-23691 beginning on page 41129 in the issue of Tuesday, October 9, 1990, the docket line was omitted and should read as set forth above.

BILLING CODE 1505-01-D

FEDERAL RESERVE SYSTEM

12 CFR Part 226

[Regulation Z; Docket No. R-0687]

Truth in Lending; Home Equity Disclosure and Substantive Rule

Correction

In rule document 90-21974 beginning on page 38310 in the issue of Tuesday, September 18, 1990, make the following corrections:

§ 226.5b [Corrected]

1. On page 38312, in the second column, under § 226.5b(f)(3)(i), in the second line "extension" should read "extensions".

§ 226.9 [Corrected]

2. On the same page, in the same column, under § 226.9(c)(3), in the fourth line from the bottom of the page, "actions" should read "action".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Social Security Administration

20 CFR Part 416

[Reg. No. 16]

RIN 0960-AB40

Supplemental Security Income for the Aged, Blind, and Disabled; Payment of Benefits, Overpayments and Underpayments—Overpayment Defined

Correction

In rule document 90-19411 beginning on page 33667 in the issue of Friday, August 17, 1990 make the following corrections:

1. On page 33667, in the second column, in the second full paragraph, in line 14 "Countable" should read "countable" (lowercase), and in the third from last line of that same paragraph, "willful" was misspelled.

§ 416.570 [Corrected]

2. On page 33669, in the first column, under § 416.570, in the fifth line from the bottom of the page, and in the second column, in the third line from top of the page, "XIX" should read "XVIII".

BILLING CODE 1505-01-D

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of the Under Secretary

[Docket No. D-90-930; FR-2837]

Redelegation of Authority to Chief Financial Officer Regarding Audit Management Functions

Correction

In notice document 90-21837 beginning on page 38163, in the issue of Monday, September 17, 1990, make the following correction:

On page 38164, in the first column, in the fifth paragraph, in the first and second lines "expected" should read "excepted".

BILLING CODE 1505-01-D

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 90-CE-30-AD; Amdt. 39-6741]

Airworthiness Directives; Christen Industries, Inc., Model A-1 (Husky) Airplanes

Correction

In rule document 90-21841 beginning on page 38049, in the issue of Monday, September, 17, 1990, make the following correction:

On page 38049, in the second column, the docket line, should read as set forth above.

BILLING CODE 1505-01-D

federal register

Wednesday
October 17, 1990

Part II

Department of Education

34 CFR Part 770

Library Services and Construction Act State-Administered Program; Notice of Proposed Rulemaking

DEPARTMENT OF EDUCATION

34 CFR Part 770

RIN 1850-AA39

Library Services and Construction Act State-Administered Program

AGENCY: Department of Education.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Secretary proposes to amend regulations governing the Library Services and Construction Act State-Administered Program. These proposed regulations would implement the Library Services and Construction Act (LSCA) Amendments of 1990 (Pub. L. 101-254).

DATES: Comments must be received on or before December 3, 1990.

ADDRESSES: All comments concerning these proposed regulations should be addressed to Mr. Robert Klassen, Director, Public Library Support Staff, U.S. Department of Education, 400 Maryland Avenue SW., (Capitol Building, room 402L), Washington, DC 20202-5571.

A copy of any comments that concern information collection requirements should also be sent to the Office of Management and Budget at the address listed in the Paperwork Reduction Act section of this preamble.

FOR FURTHER INFORMATION CONTACT: Robert Klassen, Telephone: (202) 357-6303.

SUPPLEMENTARY INFORMATION: The LSCA Amendments of 1990 (Pub. L. 101-254), enacted on March 15, 1990, authorizes Federal assistance through fiscal year 1994 for titles I through III of the Act, and makes other changes.

1990 Amendments to the Statute

(1) Title I (Library Services) is amended by expanding specific purposes to include intergenerational programs that match older adult volunteers with school children after school to help then improve their reading skills, mobile library programs for child-care centers, library literacy center coordinated by the State library agency, and materials and programs aimed at preventing and eliminating drug abuse. Other amendments allow the State to make subgrants to library systems or networks that include libraries other than public libraries, and assist libraries in making effective use of technology to improve services. Ratable reductions of grants to major urban resource libraries, to the extent that Federal allocations to the State are reduced, or the 1990 Census shows the population of the city has decreased, are allowed, along with ratable reductions of maintenance-of-effort for institutional library services and library services to the physically handicapped to the extent that the populations served have declined.

(2) Title II (Public Library Construction) amendments allow libraries to acquire substantial technological equipment, whether or not it is part of the construction of a library facility. They also add a requirement that grantees follow policies and procedures in the construction of public libraries that will promote the preservation of resources to be used in the facilities.

(3) Title III (Interlibrary Cooperation and Resource Sharing) amendments allow for the development of the technological capacity of libraries for interlibrary cooperation and resource sharing and provide that public and school libraries that cooperate to make school library resources available to the public when school is not in session may be reimbursed for those expenses. A new section 305 authorizes the use of title III funds for preservation programs which are to be based on a statewide preservation cooperation plan that identifies preservation objectives and specifies methods by which the State library agency will work with libraries and other organizations concerned with preservation to develop plans, training, and service programs to ensure that endangered resources are preserved systematically.

Major Changes to the Regulations

The following proposed regulatory amendments reflect changes in the authorizing statute. As a result of these changes, various sections or paragraphs have been renumbered. Some of the revisions are minor; others are more significant. Among the provisions in the regulations implementing changes in the authorizing statute are the following:

- The definition for handicapped would be deleted because the Act now contains a definition for "handicapped individuals."
- The regulations would specify many new activities for which the Secretary may provide assistance under the Act, including the following:

—Intergenerational projects using adult volunteers to help latchkey children develop reading skills;
—Library services to child-care centers;
—Model library literacy centers to reduce the number of illiterate individuals and enhance their employment opportunities;
—Materials and projects aimed at preventing and eliminating drug abuse; and
—Making effective use of technology.

- The regulations would describe new preservation projects that the Secretary may fund under title III, and would permit a State to include in its long-range program a Statewide preservation cooperation plan.
- The regulations would permit Title I grantees to make subgrants to library systems or networks that include libraries other than public libraries.
- The regulations would permit use of Title II grant funds for remodeling to ensure safe working environments.
- The regulations would also require an assurance that libraries receiving any funds under the Act will not discriminate in providing space for public meetings.
- The regulations would permit ratable reductions in expenditures for State institutional library services and library services for the physically handicapped, and in maintenance of support for major urban resource libraries in certain circumstances.
- The regulations would modify the maintenance-of-effort requirements under title I of the Act. In essence, these changes would add specificity by identifying two discrete categories of expenditure requirements: State aid to public libraries and library systems and State funds expended for statewide development of public library services.

In addition, the regulations provide criteria for waiver of the maintenance-of-effort requirements in the preceding paragraph.

Executive Order 12291

These proposed regulations have been reviewed in accordance with Executive Order 12291. They are not classified as major because they do not meet the criteria for major regulations established in the order.

Regulatory Flexibility Act Certification

The Secretary certifies that these proposed regulations would not have a significant economic impact on a substantial number of small entities. Under this State-Administered program, grants for public library services, for public library construction and technology enhancement, and for interlibrary cooperation and resource sharing are available only to States and State library administrative agencies. States and State agencies are not considered to be small entities under the Regulatory Flexibility Act. To the extent that these regultions have an impact on small entities, they implement statutory requirements. The regulations concerning this program do not impose any non-statutory requirements that will

have a significant economic impact on the small entities affected.

Paperwork Reduction Act of 1980

Sections 770.20, 770.21, 770.22, 770.23 and 770.24 contain information collection requirements. As required by the Paperwork Reduction Act of 1980, the Department of Education will submit a copy of these sections to the Office of Management and Budget (OMB) for its review. (44 U.S.C. 3504(h))

States are eligible to apply for grants under these regulations. The Department needs and uses the information to make grants. Annual public reporting burden for this collection of information is estimated to average 31 hours per response for 54 respondents, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Organizations and individuals desiring to submit comments on the information collection requirements should direct them to the Office of Information and Regulatory Affairs, room 3002, New Executive Office Building, Washington, DC 20503; Attention: Daniel J. Chenok.

Intergovernmental Review

This program is subject to the requirements of Executive Order 12372 and to the regulations in 34 CFR part 79. The objective of this Executive Order is to foster an intergovernmental partnership and a strengthened federalism by relying on processes developed by State and local governments for coordination and review of proposed Federal financial assistance.

In accordance with the order, this document is intended to provide early notification of the Department's specific plans and actions for this program. (Please note that Federally recognized Indian tribal governments are not subject to Executive Order 12372.)

Invitation To Comment

Interested persons are invited to submit comments and recommendations regarding these proposed regulations.

The Secretary particularly requests comments on § 770.41(b) to determine if the guidance provided is sufficiently clear concerning events leading to and resulting from a waiver of the maintenance-of-effort, §§ 770.41(b)(2) and 770.42(b) on criteria for waiver of maintenance-of-effort requirements, and how the Secretary determines that the population of the institutionalized and physically handicapped has declined, respectively.

All comments submitted in response to these proposed regulations will be available for public inspection, during and after the comment period, in room 402L, Capital Building, 555 New Jersey Avenue NW., Washington, DC., Monday through Friday of each week except Federal holidays, between the hours of 8:30 a.m. and 4 p.m.

To assist the Department in complying with the specific requirements of Executive Order 12291 and the Paperwork Reduction Act 1980 and their overall requirement of reducing regulatory burden, the Secretary invites comment on whether there may be further opportunities to reduce any regulatory burdens found in these proposed regulations.

Assessment of Educational Impact

The Secretary particularly requests comments on whether the proposed regulations in this document would require transmission of information that is being gathered by or is available from any other agency or authority of the United States.

List of Subjects in 34 CFR Part 770

Aging—libraries, Child-care centers, Construction—libraries, Correctional institutions—libraries, Drug abuse, Education, Education of disadvantaged, Grant programs—education, Handicapped, Libraries, Limited English-speaking proficiency, Literacy, Mental health programs—libraries, Network(s), Penal institutions—libraries, Preservation, Prisons—libraries, Reporting and recordkeeping requirements.

(Catalog of Federal Domestic Assistance Numbers: 84.034 Library Services; 84.154 Public Library Construction; 84.035 Interlibrary Cooperation and Resource Sharing)

Dated: October 11, 1990.

Lauro F. Cavazos,

Secretary of Education.

The Secretary proposes to amend title 34 of the Code of Federal Regulations by revising part 770 to read as follow:

PART 770—THE LIBRARY SERVICES AND CONSTRUCTION ACT STATE-ADMINISTERED PROGRAM

Subpart A—General

Sec.

Authority: 20 U.S.C. 351 *et seq.*, unless otherwise noted.

Subpart A—General

§ 770.1 The Library Services and Construction Act State-Administered Program.

Under the Library Services and Construction Act State-Administered Program—referred to in this part as the State-Administered Program—the Secretary provides Federal funds to assist States to—

(a) Extend and improve public library services;

(b) Construct, renovate and enhance the technology of public libraries; and

(c) Develop and strengthen interlibrary cooperation, resource sharing, and the preservation of library resources.

(Authority: 20 U.S.C. 351, 353, 355b, 355)

§ 770.2 Who is eligible to apply for a grant under the State-Administered Program?

Under the State-Administered Program the following parties are eligible to apply:

(a) States are eligible to apply to the Secretary for—

(1) Public Library services grants under title I of the Act;

(2) Public Library Construction and Technology Enhancement grants under title II of the Act; and

(3) Interlibrary Cooperation and Resource Sharing grants under title III of the Act.

(b)(1) Public libraries are eligible to apply to their respective States for subgrants under each type of grant specified in paragraph (a) of this section.

(2) Library systems or networks that include libraries other than public libraries are eligible to apply for a subgrant under title I of the Act if the purpose of the subgrant is to improve services for public library patrons.

(3) In the case of Interlibrary Cooperation and Resource Sharing grants, a State may also permit other types of libraries to apply for subgrants.

(Authority: 20 U.S.C. 351d, 352, 355a, 355e)

§ 770.3 What regulations apply to the State-Administered Program?

The following regulations apply to the State-Administered Program:

(a) The Education Department General Administrative Regulations (EDGAR) in 34 CFR part 74 (Administration of Grants to Institutions of Higher Education, Hospitals and Nonprofit Organization), part 76 (State-Administered Programs), part 77 (Definitions that Apply to Department Regulations), part 79 (Intergovernmental Review of Department of Education Programs and Activities), part 80 (Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments), part 81 (General Education Provisions Act—Enforcement), part 82 (New Restrictions on Lobbying), part 85 (Governmentwide Debarment and Suspension (Nonprocurement) and Governmentwide Requirements for Drug-Free Workplace (Grants), and part 86 Drug-Free Schools and Campuses.

(b) The regulations in this part 770.

(Authority: 20 U.S.C. 351 *et seq.*)

§ 770.4 What definitions apply to the State-Administered Program?

(a) *Definitions in the Act.* The following terms used in this part are defined in section 3 of the Act:

Adult with limited literacy skills
Annual program
Basic State plan
Construction
Educationally disadvantaged adult
Handicapped individual
Hawaiian native
Indian tribe
Library service
Library services for the physically handicapped
Long-range program
Major urban resource library
Network
Public library
Public Library Services
State Advisory Council on Libraries
State institutional library services
State library administrative agency
Technology enhancement

(b) *Definitions in EDGAR.* The following terms used in this part are defined in 34 CFR 77.1:

Acquisition
Applicant
Application
Department
EDGAR
Facilities
Fiscal year
Grant
Grantee
Nonprofit
Private
Project
Public
Secretary
State
Subgrant
Subgrantee

(c) *Other definitions that apply to this part.* The following definitions apply to this part:

Act means the Library Services and Construction Act, as amended.

Community information referral center means a center that provides information and makes referrals to link people in need of services to appropriate resources.

Disadvantaged means persons whose socio-economic or educational deprivation or whose cultural isolation from the general community may preclude them from benefiting from public library services to the same extent as the general community benefits from these services.

Illiteracy means the inability of an individual to read, write, or comprehend or to perform basic arithmetical computations.

Interlibrary cooperation means the systematic and effective coordination of the resources of school, public, academic, and special libraries and information centers.

Interlibrary Cooperation and Resource Sharing grants means Federal financial assistance provided by the Secretary under title III of the Act.

Library materials means books, periodicals, newspapers, documents, pamphlets, photographs, reproductions, microforms, pictorial works, graphic works, musical scores, maps, charts, globes, sound recordings, slides, films, filmstrips processed video and magnetic tapes, computer software, and materials designed specifically for the handicapped.

Limited English-speaking proficiency, where used with reference to individuals, means individuals who—

(1)(i) Were not born in the United States or whose native tongue is a language other than English;

(ii) Come from environments where a language other than English is dominant; or

(iii) Are American Indian and Alaskan Natives and who come from environments where a language other than English has had a significant impact on their level of English language proficiency; and

(2) Because of one of the reasons listed in paragraph (1) of this definition, have sufficient difficulty speaking, reading, writing, or understanding the English language to be denied the opportunity to learn successfully in classrooms where the language of instruction is English or to participate fully in society.

Literacy means the ability of an individual to read, write, and comprehend and to perform basic arithmetic computations.

Literacy program means a project or activity designed to help individuals improve their ability to read, write, or comprehend or to perform basic arithmetical computations.

Public Library Construction and Technology Enhancement grants means Federal financial assistance provided by the Secretary under title II of the Act.

Public Library Services grants means Federal financial assistance provided by the Secretary under title I of the Act.

(Authority: 20 U.S.C. 351 *et seq.*)

Subpart B—What Kinds of Activities Does the Secretary Assist Under This Program?

§ 770.10 What types of projects may be funded under Public Library Services grants?

(a) The Secretary awards Public Library Services grants to assist projects

designed to plan for, establish, extend, or improve public library services.

(b) The types of projects referred to in paragraph (a) of this section may include, but are not restricted to, the following:

(1) Extending public library services to areas and populations that lack these services.

(2) Improving public library services to ensure that these services are adequate to meet the needs of specific areas and populations.

(3)(i) Making public library services accessible to individuals who, because of a disadvantage, are unable to benefit from public library services regularly made available to the general public.

(ii) These disadvantages include, but are not restricted to, distance, residence, handicap, age, literacy level, and limited English-speaking proficiency.

(4) Establishing, expanding, and operating programs to improve State and local public library services for—

(i) The elderly;

(ii) The institutionalized;

(iii) The physically handicapped; and

(iv) The disadvantaged in urban and rural areas.

(5) Adapting public library services to meet particular needs of individuals.

(6) Assisting libraries to serve as community information referral centers.

(7) Assisting libraries in providing literacy programs for adults and school dropouts.

(8) Establishing and supporting model library literacy centers, coordinated by the State library administrative agency with other interested State agencies and nonprofit organizations to reduce the number of functionally illiterate individuals and to help them reach full employment.

(9) Assisting libraries in developing intergenerational library programs that will match older adult volunteers with libraries interested in developing after school literacy and reading skills programs for unsupervised children during afterschool hours.

(10) Assisting libraries in providing mobile library services and programs to licensed or certified child-care providers or child-care centers.

(11) Assisting libraries in providing and displaying educational materials, and conducting community programs aimed at preventing and eliminating drug abuse, in cooperation with local education agencies, or other agencies or organizations.

(12) Strengthening the capacity of the State library to meet the needs of the people of the State with regard to library services, facilities, and resources.

(13) Supporting and expanding the services of major urban resource libraries that meet the demands of individual users and other libraries.

(14) Assisting public libraries in making effective use of technology to improve library and information services.

(15) Strengthening metropolitan libraries that serve as national or regional resource centers.

(Authority: 20 U.S.C. 351(a), 351a, 352, 353)

§ 770.11 What types of projects may be funded under Public Library Construction and Technology Enhancement grants?

The Secretary awards Public Library Construction and Technology Enhancement grants to assist projects designed to carry out construction, remodeling and technology enhancement including the following:

(a) Construction of new buildings.

(b) Acquisition, expansion, remodeling, and alteration of existing buildings.

(c) Purchase, lease, and installation of equipment for any building referred to in paragraphs (a) and (b) of this section. As used in this paragraph "equipment" includes the following:

(1) Machinery.

(2) Utilities.

(3) Built-in equipment.

(4) Information and building technologies.

(5) Video and telecommunications equipment.

(6) Enclosures or structures necessary to house the types of items listed in paragraphs (c)(1) through (5) of this section.

(7) All other items necessary for the functioning of a particular facility to provide for public library services.

(d) Remodeling to meet the standards of the Architectural Barriers Act of 1968.

(e) Remodeling designed to ensure safe working environments and to conserve energy.

(f) Renovation or remodeling to accommodate new technologies.

(g) Purchase of existing historic buildings for conversion to public libraries.

(h) Technology enhancement.

(i) Any combination of activities referred to in paragraphs (a) through (h) of this section (including architect's fees and the cost of acquisition of land).

(Authority: 20 U.S.C. 351a(2), 355a, 355c; EO 11490, as amended)

§ 770.12 What types of projects may be funded under Interlibrary Cooperation and Resource Sharing grants?

The Secretary awards Interlibrary Cooperation and Resource Sharing grants to assist projects designed to enable various types of libraries to share resources and materials. These types of projects include the following:

(a) Planning for, and taking other steps leading to the development of, cooperative library networks. Planning may include—

(1) Development of a statewide resource sharing plan directed toward attaining compliance with section 304 of the Act; or

(2) One or more of the items listed in section 304(c) of the Act.

(b) Establishing, expanding, or operating local, regional, or interstate cooperative library networks.

(c) Developing the technological capacity of libraries for interlibrary cooperation and resource sharing.

(d) Developing and implementing a statewide preservation cooperation plan for systematically preserving endangered library and information resources. Such a plan is to be developed in consultation with such parties and agencies as—

(1) The State archives;

(2) Historical societies;

(3) Libraries;

(4) Scholarly organizations; and

(5) Other interested parties.

Further, the State library administrative agency may contract with other agencies or institutions for part or all of the preservation activities in the plan.

(Authority: 20 U.S.C. 351(a), 355e–1(a), 355e–2)

Subpart C—How Does a State Apply for a Grant?

§ 770.20 What must a State do to receive a grant under the State-Administered Program?

(a) In order to receive a grant under the State-Administered Program, a State must—

(1) Establish a State Advisory Council or Libraries; and

(2) After consulting with the council, submit to the Secretary by the various dates established by the Secretary the three parts of a State plan, as described in § 770.21.

(b) The Secretary does not consider the other parts of the plan until the Secretary has approved the basic State plan.

(Authority: 20 U.S.C. 351d(a))

§ 770.21 What must a State plan include?

A State plan must consist of the following three parts:

(a)(1) A basic State plan, as described in § 770.22, covering a five-year period.

(2) The State shall submit one basic plan to cover all types of grants provided under this program:

(i) Public Library Services grants.
(ii) Public Library Construction and Technology Enhancement grants.
(iii) Interlibrary Cooperation and Resource Sharing grants.
(b)(1) A long-range program, as described in § 770.23, covering a period of not fewer than three years and not more than five years.
(2) The State library administrative agency shall develop the long-range program—
(i) With the advice and assistance of the State Advisory Council or Libraries; and
(ii) In consultation with the Secretary.
(3) The State shall—
(i) Submit a long-range program that provides a comprehensive description of the State's identified library needs and a description of the activities to be taken toward meeting those needs supported with the assistance of the LSCA State-Administered Program;
(ii) Review the program each year;
(iii) Revise the program each year according to changing needs and the results of evaluations and surveys; and
(iv) Submit the revised program to the Secretary.
(c) An annual program, as described in § 770.24, for each type of grant for which the State is applying.

(Authority: 20 U.S.C. 351d(a))

§ 770.22 What must a State include in a basic State plan?

A State shall include the following in its basic State plan:
(a) Assurance that the State library administrative agency—
(1) Will administer or supervise the administration of all programs and projects in the State assisted under the State-Administered Program;
(2) Has the fiscal and legal authority and capability to administer or supervise the administration of programs and projects assisted under the State-Administered Program;
(3) Has established or will establish policies, priorities, criteria, and procedures necessary to implement the program in the State;
(4)(i) Will make the reports the Secretary reasonably requires to—
(A) Carry out the Secretary's functions under the program; and
(B) Determine the extent to which funds provided under the program have been effective in carrying out the purposes of the program;
(ii) Will include in these reports, if requested by the Secretary, reports of evaluations made under the State plan; and
(iii) Will make the reports in the form and containing the information reasonably required by the Secretary; and
(5)(i) Will keep the records the Secretary finds necessary to assure the correctness and verification of the reports referred to in paragraph (a)(4) of this section; and
(ii) Will give the Secretary access to the records as the Secretary finds necessary.
(b) Assurances that—
(1) Any funds paid to the State under a long-range program and an annual program will be expended only for the purposes for which the funds have been authorized and appropriated;
(2) The State has adopted the necessary fiscal control and fund accounting procedures to assure proper disbursement of, and to account for, Federal funds paid—
(i) To the State under the State-Administered Program; and
(ii) By the State to any other agency under the program;
(3) The State will give priority to programs and projects designed to carry out the following objectives:
(i) To improve access to public library resources and services for the least served populations in the State, including—
(A) Projects for individuals with limited English-speaking proficiency;
(B) Projects for individuals who are handicapped; and
(C) Projects in urban and rural areas.
(ii) To serve the elderly.
(iii) To combat illiteracy.
(iv) To increase library services and access to services through effective use of technology; and
(4) Libraries within the State that receive funds under this Act will not discriminate on the basis of race, religion, age, gender, national origin, or handicapping condition in providing space for public meetings.

(Authority: 20 U.S.C. 351a(11), 351d(b))

§ 770.23 What must a State include in a long-range program?

(a) A State shall include the following in a long-range program covering all activities under the State-Administered Program:
(1) A comprehensive description of the State's identified present and projected library needs.
(2) A plan for meeting those identified needs with Federal funds made available through the appropriate type of grant under the State-Administered Program.
(3)(i) The State's policies, priorities, criteria, and procedures for administering this type of grant and appropriate subgrants under the State-Administered Program.
(ii) A description of how the State plans to implement the priorities in § 770.22(b)(3).
(4) A description of the State's policies and procedures regarding each of the following:
(i) The periodic evaluation of the effectiveness of projects supported under this type of grant in measurable terms appropriate to the purpose of the program and the project.
(ii) The appropriate dissemination of project evaluations and other information pertaining to these projects.
(iii) The coordination of projects assisted under this type of grant with similar library programs and projects operated by other libraries, institutions, and agencies in the State.
(b) In the case of an application for a Public Library Construction and Technology Enhancement grant, the State shall also include in its long-range program the policies and procedures to be followed by the State library administrative agency in providing an opportunity for a hearing to a local or other public agency whose application for a subgrant is denied.
(c) In the case of an application for an Interlibrary Cooperation and Resource Sharing grant, the State shall also include the following in its long-range program:
(1) A statewide resource sharing plan directed toward attaining compliance with the provisions of section 304 of the Act. In developing the plan, the State library agency, with the assistance of the State Advisory Council on Libraries, shall consider recommendations from current and potential participating institutions in interlibrary cooperation and resource sharing projects authorized under the Act.
(2) An identification of interlibrary cooperation and resource sharing objectives to be achieved during the period covered by the basic State plan and the long-range program. These objectives may include, but are not restricted to, one or more of the items listed in section 304(c) of the Act.
(3)(i) A State that intends to use Federal funds for the preservation of library materials shall also include in its long-range program a statewide preservation cooperation plan (preservation plan) that—
(A) Identifies the preservation objectives to be achieved during the period covered by the long-range program; and
(B) Specifies the methods by which endangered library and information resources are to be preserved systematically.

(ii) In developing the preservation plan, a State shall consult with parties and agencies such as the State archives, historical societies, libraries, scholarly organizations, and other interested parties.

(iii) In carrying out the preservation plan, a State shall work with libraries, archives, historical societies, scholarly organizations and other agencies, within or outside the State, in planning, education and training, coordinating, outreach and public information, and service programs.

(Authority: 20 U.S.C. 351(a), 351a(12), 351d(a)(d), 355c, 355e, 355e–2, 355e–3)

§ 770.24 What must a State include in an annual program?

(a) A State shall include the following in an annual program:

(1) A description of the projects and activities the State plans to carry out—and the basis upon which the State plans to award subgrants—during the specified year with regard to public library services, public library construction and technology enhancement, or interlibrary cooperation and resource sharing, as appropriate.

(2) A description of how these projects and activities would—

(i) Be consistent with purposes specified in the Act and in §§ 770.10, 770.11, or § 770.12, as appropriate;

(ii) Fulfill the objectives of the State's long-range program or the update of the long-range program; and

(iii) Meet the needs identified by the State in the long-range program.

(3) A description of the criteria the State plans to use in allocating funds.

(4)(i) A demonstration that the manner in which the State proposes to carry out the annual program is consistent with the policies, criteria, priorities, and procedures specified in the long-range program or update of the long-range program.

(ii) In meeting this requirement, the State shall address, among other items, policies and procedures regarding evaluations, dissemination, and coordination, as described in § 770.23(a)(4).

(5) A description of how proposed projects and activities are to be based on the results of evaluations described in § 770.23(a)(4)(i) undertaken according to the long-range program.

(6) A demonstration that proposed projects and activities would meet the assurance given by the State in its basic State plan to implement the priorities specified in § 770.22(c), if appropriate.

(7) The amount of Federal funds the State plans to spend to carry out its administrative functions under the grant, as specified in § 770.43.

(b) In the case of an application for a Public Library Services grant, the State shall also include the following in its annual program:

(1) The criteria the State plans to use to ensure that the State meets the financial obligations specified in § 770.40, § 770.41 and § 770.42.

(2) A description of how the State plans to allocate funds to support and expand library services of major urban resource libraries if—

(i) The sum appropriated for the year exceeds the amount specified in section 102(c)(1) of the Act; and

(ii) The State has one or more cities with populations of at least 100,000 individuals.

(3) A description of how the State plans to use funds for projects and activities for the elderly.

(4) A description of how the State plans to use funds to make public library services and programs more accessible to handicapped individuals.

(5)(i) To enable the Secretary to make a determination of payment under section 7(a) of the Act (Payments), a statement of the amounts the State will have available for expenditure for the proposed projects and activities during the period covered by the annual program from—

(A) State sources; and

(B) Local sources.

(ii) The State may not include in-kind contributions among the amounts the State declares it will have available for expenditure under paragraph (b)(5)(i) of this section.

(c) In the case of an application for a Public Library Construction and Technology enhancement grant, the State shall also include in its annual program a description of how the State plans to—

(1) Use funds that year, consistent with the long-range program, for approved construction projects in areas of the State lacking the library facilities necessary to provide adequate public library services; and

(2) Follow policies and procedures in the construction of the public libraries that will promote the preservation of library and information resources to be used in the facilities.

(d) In the case of an application for an Interlibrary Cooperation and Resource Sharing grant, the State shall also include in its annual program a description of how the proposed projects and activities would meet the requirements of the Act with respect to—

(1) The statewide resources sharing plan;

(2) The interlibrary cooperation and resource sharing objectives identified in the long-range program; and

(3) If applicable, the statewide preservation cooperation plan as described in § 770.23(c)(3).

(Authority: 20 U.S.C. 351, 351a(13), 351d(a), (b)(4); 351e(a)(1), 354, 355c, 355e–2, 355e–3)

Subpart D [Reserved]

Subpart E—What Conditions Must Be Met by a State and Its Subgrantees?

§ 770.40 What matching requirements apply to a Public Library Services grant?

In order to receive a Public Library Services grant, a State shall have available, from State and local sources, for expenditure for the projects and activities proposed in its annual program an amount that equals or exceeds the difference between—

(a) The cost of carrying out the State's annual program; and

(b) The Federal share of these costs, as specified in section 7(b) of the Act.

(Authority: 20 U.S.C. 351e(b), 354)

§ 770.41 What are the basic maintenance-of-effort requirements for a Public Library Services grant?

(a) *Basic maintenance-of-effort.* In order to receive a Public Library Services grant, a State shall have available for expenditure—

(1) For State aid to public libraries and library systems, an aggregate amount equal to 90 percent of the amount actually expended by the State for those purposes in the second preceding fiscal year; and.

(2) For the State library administrative agency, or the part of the State library administrative agency charged by State law with extending and developing public library services throughout the State, an aggregate amount equal to 90 percent of the amount actually expended for those purposes in the second preceding fiscal year.

(b) *Waiver.* (1) The Secretary may waive the basic maintenance-of-effort requirements, if the Secretary determines that application of paragraph (a) of this section would be unjust or unreasonable in light of exceptional extenuating circumstances.

(2) The circumstances under which the Secretary may waive the basic maintenance-of-effort requirements included, but are not limited to, the following:

(i) A natural disaster affecting the State.

(ii) A precipitous decline in the financial resources of the State, except that the Secretary does not consider the

effect of State tax initiatives or referenda in determining whether to grant a waiver.

(3)(i) If the Secretary grants a waiver under this section, the amount of funds that the State library administrative agency is otherwise entitled to receive under this part is not reduced.

(ii) In determining the basic maintenance-of-effort for any year following the fiscal year for which a waiver is granted, the State agency shall expend at least 90 percent of the amount that it should have expended in the waiver year had the waiver not been granted.

Example: In fiscal year 1991 a State library administrative agency obtains a waiver under this section because it will have available for expenditure for FY 1991 less than 90 percent of its actual expenditures in the second preceding year (1989) due to exceptional extenuating circumstances. In determining whether the agency meets the basic maintenance-of-effort requirements for fiscal year 1993, the State agency must have available for expenditure at least 90 percent of its actual expenditures for 1989, the second fiscal year preceding the year for which the waiver was granted, and not 90 percent of its actual expenditures in FY 1991 (the wavier year). Thus, if the State agency expended $3,000,000 in FY 1989, $2,800,000 in FY 1990, and only $2,500,000 in FY 1991, when it should have expended $2,700,000 (90 percent of $3,000,000) but obtained a waiver instead, then in FY 1993 it must expend 90 percent of $2,700,000, for a total of $2,430,000, rather than 90 percent of $2,500,000 (the amount it actually expended in FY 1991), or $2,250,000.

(Authority: 20 U.S.C. 351e(a))

§ 770.42 What other maintenance-of-effort requirements apply to a Public Library Services grant?

(a) In addition to the requirements in § 770.41, in order to receive a Public Library Services grant a State shall spend for State institutional library services and library services to the physicially handicapped, from Federal, State, and local sources, an amount not less than the amount that the State spent from those sources for those services during the second preceding fiscal year.

(b) The Secretary ratably reduces the amount that a State is required to spend for institutional library services and library services to the physically handicapped to the extent that—

(1) The Federal allocation for the State's Public Library Services grant is reduced; and

(2) The Secretary determines that the populations served by those expenditures have declined.

(Authority: 20 U.S.C. 354)

§ 770.43 What maintenance of Federal support is required for major urban resource libraries?

(a) If the amount of a Public Library Services grant requires a State agency to allocate funds to support and expand library services of major urban resource libraries (see sections 102(a)(3) and (c) of the Act and § 770.23(b)(2)), the State agency may not reduce the amount it pays to an urban resource library below the amount that it paid to that library in the preceding fiscal year.

(b) The Secretary ratably reduces the amount that a State agency must pay under paragraph (a) of this section to the extent that—

(1) The Federal allocation to the State agency for its Public Library Services grant is reduced for the applicable fiscal year; or

(2) The 1990 Census shows that the population of the city served under paragraph (a) of this section has decreased.

(Authority: 20 U.S.C. 353(c))

§ 770.44 What are a State's financial obligations under a Public Library Construction and Technology Enhancement grant?

(a) A State that receives a Public Library Construction and Technology Enhancement grant shall provide, from State or local sources or both, the difference between—

(1) The costs of project financed under the grant for that year; and

(2) The Federal share of these costs, as specified in section 7(b) of the Act.

(b) In case of any individual project under a Public Library Construction and Technology Enhancement grant, at least one half of the total cost must be supplied by State or local sources or both.

(Authority: 20 U.S.C. 351e(b), 355b(b))

§ 770.45 What other financial obligation does a recipient have under a Public Library Construction and Technology Enhancement grant?

(a) Unless released from the obligation under paragraph (c) of this section, a recipient of Federal financial assistance under a Public Library Construction and Technology Enhancement grant—or the recipient's successor in title or possession—shall repay to the United States on request an amount as specified in paragraph (b) of this section if within 20 years of the completion of construction of the library facility—or part of a facility—for which the assistance was received—

(1) The recipient or its successor ceases or fails to be a public or nonprofit institution; or

(2) The facility ceases to be used as a library facility.

(b) The amount the recipient or its successor is obligated to repay is an amount that equals—

(1) The value of the facility or part of the facility at the time of the occurrence specified in paragraph (a)(1) or (a)(2) of this section, multiplied by—

(2) The ratio of—

(i) The amount of Federal assistance under the grant or subgrant; to

(ii) The cost of the facility or part of the facility for which the assistance was received.

Example: In 1977 a local public library completed a project to enlarge its reading room. The project had been assisted by a subgrant from the State under a Public Library Construction grant. The total cost of the project was $300,000; the subgrant had amounted to $120,000 a ratio of 2 to 5 or 40 percent of the cost.

In 1989 the local library moves to another district, and the facility for which it received assistance in 1977 ceases to be used as a library facility. It is determined that the part of the facility for which assistance was received has a current market value of $400,000.

The United States is entitled to recover from the local public library an amount equal to 40 percent of the current market value of the facility or portion of the facility assisted with Federal funds; that is, 40 percent of $400,000 or $160,000.

(c) The Secretary may decide, for good cause, to release the recipient from its obligation under paragraph (a) of this section.

(d) The provisions of this section apply to any facility constructed at any time with assistance under Title II of the Act.

(Authority: 20 U.S.C. 355b)

§ 770.46 What administrative costs are allowable under the State-Administered Program?

(a) A State library administrative agency may spend funds received under a Public Library Services grant and funds received under a Public Library Construction and Technology Enhancement grant to carry out its administrative functions under a Public Library Services grant, a Public Library Construction and Technology Enhancement grant, and an Interlibrary Cooperation and Resource Sharing grant.

(b) The total amount the agency may spend to carry out its administrative functions under all of these grants

during any year may not exceed the amount specified in section 8 of the Act (Administrative Cost).

(c) The agency may spend the funds for administrative costs in connection with the following activities:

(1) Administration of the State plan, including obtaining the services of consultants.

(2) Statewide planning for and evaluation of library services

(3) Dissemination of information concerning library services.

(4) Activities of the State Advisory Council on Libraries and of any other advisory groups and panels necessary to assist the State library administrative agency in carrying out its functions.

(Authority: 20 U.S.C. 351f, 353(b))

Subpart F—What Are the Administrative Responsibilities of a State and Its Subgrantees?

§ 770.50 Under what circumstance must a State provide an applicant with an opportunity for a hearing?

(a)(1) In the case of a Public Library Construction and Technology Enhancement grant, if a State denies funds to a local or other public agency that applies for a subgrant for construction of public library facilities, the State library administrative agency shall give the local or other public agency an opportunity for a hearing.

(2) The provision in 34 CFR 76.401(b) (which exempts State agencies from having to offer an opportunity for a hearing under certain State-administered programs) does not apply to Public Library Construction and Technology Enhancement grants.

(b) In providing opportunity for a hearing, the State library administrative agency shall follow the appropriate policies and procedures included in the State's long-range program for the Public Library Construction and Technology Enhancement grant.

(Authority: 20 U.S.C. 355c)

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Part III

Department of Energy

Office of Conservation and Renewable Energy

10 CFR Part 430

Energy Conservation Program for Consumer Products; Final Rule Regarding Test Procedures and Energy Conservation Standards for Water Heaters

DEPARTMENT OF ENERGY

Office of Conservation and Renewable Energy

10 CFR Part 430

[Docket No. CAS-RM-79-105]

Energy Conservation Program for Consumer Products; Final Rule Regarding Test Procedures and Energy Conservation Standards for Water Heaters

AGENCY: Office of Conservation and Renewable Energy, Department of Energy.

ACTION: Final rule.

SUMMARY: The Energy Conservation Program for Consumer Products is conducted under the Energy Policy and Conservation Act, as amended. Energy conservation standards for most types of major household appliances, including water heaters, are among the required Program elements. The legislation also requires the Department to establish standard methods of testing covered products. In the case of any amended test procedure, moreover, the Department must determine to what extent the amended test procedure would alter the measured efficiency of the related energy conservation standard and make appropriate corrections to the standard.

The purposes of the final rule announced today are (i) to improve and refine the test procedure for water heaters and (ii) to amend the energy conservation standards for electric water heaters in order to reflect the changes in measured efficiency caused by the revised test procedure. There is no change to the standard for gas and oil water heaters resulting from the revised test procedure.

In addition, today's rule also corrects the effective date of standards for mobile home furnaces in § 430.32(e) that was incorrectly published on February 7, 1989, 54 FR 6077. The correct effective date is September 1, 1990.

DATES: The effective date for this document is April 15, 1991. The effective date of standards for mobile home furnaces in § 430.32(e) is September 1, 1990.

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SUPPLEMENTARY INFORMATION:

I. Background

A. Program Requirements

Part B of title III of the Energy Policy and Conservation Act (EPCA), Public Law 94-163, as amended by the National Energy Conservation Policy Act (NECPA), Public Law 95-619, the National Appliance Energy Conservation Act (NAECA) of 1987, Public Law 100-12, and the National Appliance Energy Conservation Amendments of 1988 (NAECA 1988), Public Law 100-357, created the Energy Conservation Program for Consumer Products other than Automobiles (Program).[1] The thirteen consumer products currently subject to this program (often referred to hereafter as "covered products") include water heaters, the subject of today's rulemaking.

Under the Act, the Program consists essentially of three parts: testing, labeling, and Federal energy conservation standards. The Department of Energy (DOE or Department), in consultation with the National Institute of Standards and Technology (NIST) (formerly National Bureau of Standards), is required to amend or establish new test procedures as appropriate for each of the covered products. Section 323. The purpose of the test procedures is to produce test results which measure the energy efficiency, energy use, or estimated annual operating cost of a covered product during a representative average use cycle or period of use and shall not be unduly burdensome to conduct. Section 323(b)(3). A test procedure is not required if DOE determines by rule that one cannot be developed. Section 323(d)(1). One hundred and eighty days after a test procedure for a product is adopted, no manufacturer may represent the energy consumption of, or the cost of energy consumed by, the product except as reflected in tests conducted according to the DOE procedure. Section 323(c)(2). However, the one hundred and eighty day period referred to in section 323(c)(2) may be extended for a period of up to an additional one hundred and eighty days if the Secretary determines that the requirements of section 323(c)(2) would impose undue burden. Section 323(c)(3). Test procedures appear at 10 CFR part 430, subpart B.

Section 323(e) of the Act requires DOE to determine to what extent, if any, a proposed test procedure would alter the measured energy efficiency or measured energy use of any covered product as determined under the existing test procedure. If DOE determines that an amended test procedure would alter the measured efficiency or measured energy use of a covered product, DOE is required to amend the related energy conservation standard accordingly. In determining the amended standard, DOE is required to measure the energy efficiency or energy use of representative samples of covered products which minimally comply with the existing standard. The average efficiency of these representative samples, tested using the amended test procedure, constitutes the amended standard. Section 323(e)(2).

B. Test Procedures

The initial water heater test procedures were prescribed by notice issued September 27, 1977. 42 FR 54110 (October 4, 1977). These original procedures coupled laboratory tests and calculations to obtain estimates of energy efficiency for storage type electric, gas and oil water heaters. The laboratory tests consisted of a "cold start recovery efficiency test," which measured the ability of a water heater to heat cold water, and a "standby loss test," which measured the energy loss of a water heater when not providing heated water. Recovery efficiency and percent standby loss are then mathematically combined in the calculations to obtain an energy factor, DOE's overall measure of water heater efficiency. Also, the original procedures included calculations for determining the annual energy consumption and annual operating costs. DOE amended the water heater test procedures by notice issued August 30, 1979, in order to prescribe a "measure of a water heater's useful capacity called first hour rating," where useful capacity was the maximum hourly demand which could be met by the water heater. 44 FR 52632 (September 7, 1979).

By notice published in the Federal Register on February 8, 1984, (1984 proposal), DOE proposed to amend its test procedures for water heaters. 49 FR 4870. The purpose of the 1984 proposal was threefold: First, to extend coverage of the test procedures to heat pump water heaters, a relatively new water heater design not previously covered by the test procedures; second, to add a method of testing to determine the first hour rating of water heaters equipped with thermal compensating dip tubes

[1] Part B of title III of EPCA, as amended, is referred to in this final rule as the "Act." Part B of title III is codified at 42 U.S.C. 6291-6309.

which provide a more constant outlet water temperature by controlling the mixing of incoming cold water with stored hot water; and third, to make modifications to the test procedures that would yield more accurate determinations of energy efficiency and cost of operation for gas, oil and electric storage water heaters.

By notice published March 16, 1984, DOE, on request of the water heater industry, extended the comment period 42 days and rescheduled the March 15, 1984, public hearing to April 26, 1984. 49 FR 10071.

In comments received in 1984 and throughout 1985, numerous parties requested that DOE withdraw the 1984 proposal and wait until a more comprehensive proposal could be developed. Most notably, on October 2–3, 1985, DOE and NIST hosted a forum on testing and rating procedures for consumer products which was attended by manufacturers, utilities, States, and public interest groups. At the forum, there was unanimous agreement that DOE should withdraw the 1984 proposal and initiate the development of a single test procedure method which would be applicable to all types of residential type water heaters, including the instantaneous type of water heaters.

By notice published March 13, 1987 (1987 proposal) DOE proposed a single test procedure for all types of water heaters, including instantaneous type water heaters. 52 FR 7972. The 1987 proposal also addressed the matter of four test procedure waivers where four manufacturers of water heaters had received allowance to test certain water heaters under modified test procedures. Since publication of the 1987 proposal, a fifth manufacturer has received a test procedure waiver. The 1987 proposal would extend these modifications to all manufacturers of similar designs and thereby would terminate the five individual waivers. The five waivers are: A.O. Smith Corporation for its gas water heaters equipped with thermal compensating dip tube, 47 FR 53942 (November 30, 1982), and four manufacturers of water heaters with large thermal mass designs: Bock Water Heaters Inc., 50 FR 47106 (November 14, 1985), modified 51 FR 21975 (June 17, 1986), Ford Products Inc., 50 FR 50678 (December 11, 1985), modified 51 FR 18659 (May 21, 1986), Lochinvar Water Heaters, Inc., 51 FR 22966 (June 24, 1988), and Aero Environmental Limited, 53 FR 9687 (March 24, 1988).

The major issues covered in the 1987 proposal included:

(1) Extending the test procedure to cover heat pump water heaters and instantaneous type water heaters;

(2) Revising the method of test for all water heaters from a no draw test to a 24-hour simulated use test which includes a six-hour draw test; and

(3) Revising the first hour rating test from a calculated estimate to a direct measure for determining a water heater's ability to supply hot water.

By notice published on January 17, 1989 (1989 proposal) the Department proposed to amend the energy conservation standards of title 10, part 430, of the Code of Federal Regulations for water heaters to reflect the changes in measured efficiency which would be caused by a newly revised test procedure. 54 FR 1890. The 1989 proposal discussed all the comments made on the revision of the test procedure proposed in the 1987 proposal and included the newly revised test procedure which incorporated those comments and which was used to determine the 1989 proposed conservation standard. Furthermore, the 1989 proposal stated that the newly revised test procedure was not included for comment except in regard to the manufacturers' ability to replicate the DOE methodology in complying with the proposed efficiency standards, and indicated that the newly revised test procedure contained in the 1989 proposal would be made final when the revised standard levels for water heaters were made final. Today's notice finalizes the test procedure included in the 1989 proposal as modified by DOE in consideration of those comments dealing with the manufacturers' ability to replicate the DOE methodology in complying with the proposed standards. Today's notice also corrects various typographical errors contained in the 1989 proposal, several of which were initially identified in a correction notice published by DOE in the February 9, 1989, Federal Register. 54 FR 6364.

Today's rule amends appendix E of subpart B of 10 CFR part 430. This new test procedure is effective 180 days after publication of today's final rule. Section 323(c)(2) of the Act specifies that effective 180 days after an amended or new test procedure applicable to a covered product is prescribed, no manufacturer may make a representation with respect to energy use or efficiency of such product or the cost of energy consumed by such product, unless the product is tested in accordance with such amended or new test procedure. Section 323(c)(3) of the Act allows for an extension of an additional 180 days of the aforesaid effective date if the Secretary determines upon petition that the requirements of section 323(2) would impose an undue burden. The extant test procedure will remain in effect until the effective date of today's amendment for the purpose of rating existing water heaters. After the effective date of the amended test procedure, all calculations of energy efficiency or energy use of water heaters or cost of energy consumed by water heaters are to be based on the new test procedure. Consequently, all water heaters must be retested using the test procedure announced today.

C. Energy Conservation Standards

NAECA added a definition for water heaters, as follows:

> The term "water heaters" means a product which utilizes oil, gas, or electricity to heat potable water for use outside the heater upon demand, including—
>
> (A) storage type units which heat and store water at a thermostatically controlled temperature, including gas storage water heaters with an input of 75,000 Btu per hour or less, oil storage water heaters with an input of 105,000 Btu per hour or less, and electric storage water heaters with an input of 12 kilowatts or less;
>
> (B) instantaneous type units which heat water but contain no more than one gallon of water per 4,000 Btu per hour of input, including gas instantaneous water heaters with an input of 200,000 Btu per hour or less, oil instantaneous water heaters with an input of 210,000 Btu per hour or less, and electric instantaneous water heaters with an input of 12 kilowatts or less; and
>
> (C) heat pump type units, with a maximum current rating of 24 amperes at a voltage no greater than 250 volts, which are products designed to transfer thermal energy from one temperature level to a higher temperature level for the purpose of heating water, including all ancillary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function.

NAECA also prescribes energy conservation standards for 11 types of appliances including the following standards for gas, oil-fired, and electric water heaters.

Product class	Energy factor
1. Gas water heater	.62 – (.0019 × Rated storage volume in gallons).
2. Oil water heater	.59 – (.0019 × Rated storage volume in gallons).
3. Electric water heater	.95 – (.00132 × Rated storage volume in gallons).

These standards are effective for products manufactured on or after January 1, 1990.

Section 323(e) of the Act requires DOE to determine to what extent, if any, a proposed test procedure would alter the

measured efficiency or measured energy use of any covered product as determined under the existing test procedure. Today's final rule satisfies this requirement with respect to the 1989 proposal. Furthermore, section 323(e) requires DOE to test a representative sample of covered products that minimally complies with the existing standard using the proposed test procedures; today's final rule is based on testing a sample of units in accordance with the 1989 proposal which has been revised as discussed, *infra*. Based on the testing, DOE has determined that the standard for electric water heaters shall be changed to; .93 −(.00132×Rated storage volume in gallons). The standards for gas and oil water heaters shall remain unchanged.

Section 323(e) of the Act also provides that models of covered products in use before the date on which the amended energy conservation standard becomes effective (or revisions of such models that come into use after such date and have the same energy efficiency or energy use characteristics) that comply with the energy conservation standard applicable to such covered products on the day before such date shall be deemed to comply with the amended energy conservation standard.

Today's rule, by establishing test procedures for heat pump water heaters and gas fueled instantaneous water heaters, also extends the coverage of the standards to these products. Heat pump water heaters must meet the energy standards for electric water heaters and gas fueled instantaneous water heaters must meet the energy standards for gas water heaters. In the case of gas fueled instantaneous water heaters, the rated storage volume may be zero.

II. Discussion

A. Test procedures

DOE is setting forth herein the final amended test procedures which incorporate changes made to the 1989 proposal. Several comments were received in regard to correcting typographical errors and relating to a manufacturer's ability to replicate the DOE methodology in complying with the new efficiency standards.

Specification of Electrical Supply Voltage

Shu Miyazaki (Miyazaki) states the current test procedure specifies that the electrical supply voltage be maintained to within +/− 1 percent of the center of the voltage range specified by the manufacturer. (Miyazaki, No. 74 at 2).[2] Miyazaki maintains that this specification will result in different first hour ratings for three identical storage-type water heaters in which only the specified supply voltage varies. Miyazaki believes that it is absolutely necessary to test all electric water heaters at the same voltage.

Miyazaki is correct in stating that different first hour ratings will result if identical storage type-water heaters are tested with supply voltages which vary in magnitude. However, the Department believes it is important that water heaters should be tested at the manufacturers' specified voltage rating. For the vast majority of storage-type water heaters, a fixed voltage is given on the rating plate rather than a specified range. Heat pump water heater manufacturers typically specify a voltage range. These various voltage ratings are not all the same. It does not seem appropriate to require a commercial test laboratory to select, for example, a 240 volt supply voltage when the rating plate specifies a range of 210 to 230 volts. Thus DOE concludes that the test procedure should not be altered as suggested by Miyazaki.

Heat Traps

Public Utility District Number 1 (PUD1) of Snohomish County, Washington State, comments that it currently operates a rebate program which offers residential customers a $50 rebate if they replace their existing electric water heater with an energy-efficient one. (PUD1, No. 87, at 1). Qualification for the rebate program is based upon the energy factors published within The Gas Appliance Manufacturers Association (GAMA) "Consumers' Directory of Certified Efficiency Ratings." The issue in question relates to the testing of the unit with heat traps if they are supplied with the water heater but are not made an integral part of the unit. PUD1 states that since there is no guarantee that the heat traps will actually be installed, the energy factor and Energy Guide label should not reflect the addition of any accessories, i.e., heat traps.

Section 4.3 of the proposed test procedure states "if heat traps and/or piping insulation are supplied with the water heater, then they shall be installed for testing." The Department agrees that there is no way to guarantee that these items will be installed when the water heater is placed into service. However, if a unit is supplied with heat traps and/or piping insulation by the manufacturer, DOE believes it is reasonable to assume that these items will be used. Therefore, DOE finds that the test procedure not be changed to address the issue raised.

Definition of Instantaneous Water Heaters

GAMA suggests that the definition of instantaneous water heaters be revised to include a criterion which limits the outlet temperature to 180 °F or less. (GAMA, No. 78, at 2; and No. 87, at 3). GAMA contends that this criterion is a common point of differentiation between commercial and residential water heaters. GAMA further states that the 180 °F criterion is already included in the definitions for gas, electric, and oil storage-type water heaters in the test procedures. In particular GAMA suggests the following:

> Gas fueled instantaneous water heater means a water heater which utilizes gas as the energy source controlled manually or automatically by a water flow activated control or a combination of water flow and thermostatic control, which is designed to deliver water at a controlled temperature of less than 180 °F, and which has an input greater than 50,000 Btu per hour and less than 200,000 Btu per hour, and a manufacturer's specified storage capacity of less than 2 gallons.

DOE agrees with the above definition of a gas fueled instantaneous water heater and has incorporated it within the test procedure.

Copper Tubing

GAMA states that the reference to copper tubing in section 4.3 of the test procedure should be clarified to specify the type used for water lines, i.e., Type "L" hard copper tubing, as opposed to copper tubing used for refrigerant lines. (GAMA, No. 78, at 2).

DOE concurs with GAMA on this issue and has changed the statement from "Copper tubing, the same size as the connections on the water heater shall be connected to the tank and extend 24 inches in length" to "Type 'L' hard copper tubing, the same size as the connections on the water heater, shall be connected to the tank and extend 24 inches in length."

Location of Storage Tank Temperature Measurement Probes

GAMA recommends that in addition to utilizing the anodic device opening or the relief valve opening to insert the temperature measurement probes within a storage-type water heater, the use of the hot water outlet opening should also be permitted. (GAMA, No. 78, at 2 and

[2] Comments on the 1984, 1987, and 1989 proposed rules were assigned docket numbers and are numbered consecutively.

3). Specifically, GAMA recommends that section 4.5 of the proposed test procedure be modified as follows:

The temperature sensors shall be installed either through (1) the anodic device opening; (2) the relief valve opening; or (3) the hot water outlet. If installed through the relief valve opening or the hot water outlet, a tee fitting or outlet piping, as applicable, is installed as close as possible to its original location. If the hot water outlet includes a heat trap, the heat trap shall be installed on top of the tee fitting. Added fittings shall be covered with thermal insulation having an R value of 4 hr ft °F/Btu.

DOE agrees with the recommendation and in section 4.5 of the test procedure has adopted GAMA's recommended language to permit the installation of the temperature measurement probes through the hot water outlet.

Prescribed Value of Density of Water

GAMA notes that the value of the density of water, 8.214 lbm/gal for 58 °F, is incorrect in section 5.1.1. (GAMA, No. 78, at 3).

Section 5.1.1 has been changed to remove the incorrect number and to require the use of the density of water at the appropriate temperature which will vary due to allowable tolerances during each test.

Prescribed Value of Specific Heat

GAMA requests that values for specific heat be prescribed throughout the test procedure. (GAMA, No. 78, at 3).

The values for specific heat cannot be prescribed in advance since they are dependent on the inlet and outlet water temperatures which will vary due to allowable tolerances during each test. Accordingly, this suggestion is rejected.

First Hour Rating Test

GAMA does not understand why a draw is initiated to activate the heating element(s) or burner unit prior to the first hour rating test if the mean tank temperature is within the specified temperature range. (GAMA, No. 78, at 3).

The purpose of the draw noted by GAMA was to eliminate the possibility that the beginning of the first hour rating test would coincide with the heating element or burner unit being activated to recover the tank from standby losses. DOE believed that this could cause repeatability problems. However, through continuing testing at NIST, DOE has discovered that this would not be a problem and the requirement of the draw has been eliminated.

Test Setup for Table Top Water Heaters

GAMA states that the attachment of two feet of copper tubing rising vertically from table top water heaters is inappropriate. (GAMA, No. 87, at 2). GAMA states that for this type of water heater the pipes are run horizontally out from the tank and subsequently downward. GAMA suggests that the following statement be added to section 4.3 of the revised test procedure:

A water heater 36 inches high or less (commonly referred to as an under counter or table top model) intended for installation either beneath, adjacent to or in conjunction with a counter shall have the inlet and outlet connections configured as illustrated in Figure 4. If the water heater is not factory equipped with pipe to extend the field connection point of the water lines to outside of the jacket or cabinet, copper tubing shall be used to extend the water line horizontally to the exterior of the jacket or cabinet.

DOE concurs with the above statement. The test procedure has been changed to incorporate the information into section 4.3.

First-Hour Rating

GAMA states that the purpose of the first-hour rating is to provide a means of grouping models of similar capability for the "Ranges of Comparability" established by the Federal Trade Commission (FTC) labelling rules. (GAMA, No. 88, at 2 and 3). GAMA states that in general the revised first-hour rating will have a uniform effect on all water heaters. GAMA contends that the models in the 56 to 64 gallon FTC range of comparability may move to the 65 to 74 gallon range as a result of the proposed first-hour rating procedure. GAMA states that the same models will still be grouped together as comparable models. It further contends that there is no benefit to revising the first-hour rating test, and that the new test will create an unwarranted need for retesting.

According to GAMA, test data collected by Electrical Testing Laboratories (ETL) indicates that the hour-long first-hour rating test provides a value practically the same as the first-hour rating determined using the current test procedure. GAMA believes that the revised first-hour rating test will have a minimal effect on the measured first-hour rating and the current procedure is as appropriate as the proposed first-hour rating test.

GAMA believes that DOE should retain the current first-hour rating test and add an optional calculation method to take into account that the proposed test procedure conditions (mean tank temperature, flow rate, inlet water temperature and ambient temperature) differ from those in the existing test procedure.

DOE notes that the existing procedure interrupts the electrical power or fuel supply to the water heater during the first-hour rating procedure. Imposing a one hour power or fuel interruption is an extremely unlikely mode of operation for residential water heaters. Secondly, the current procedure requires a computation which is an attempt to determine how much additional usable hot water would be generated if 100 percent of the thermal input to the tank, less standby losses, heats the water contained within the storage tank to a usable temperature. This can result in significant error due to the fact that only a portion of the thermal input to the tank would produce usable water. The ability to convert thermal input to usable hot water is a function of the water heater design. Several water heater manufacturers are currently designing and manufacturing water heaters which maximize the conversion of thermal input into usable hot water. The existing test procedure does not give credit to the manufacturers of these innovative products.

GAMA's contention that the proposed test procedure provides a value practically the same as the first-hour rating using the existing test procedure is incorrect. For water heaters which employ two heating elements, the results of tests conducted by NIST show that the first-hour rating using the proposed test procedure yields approximately 95 percent of that obtained using the existing test procedure. For two of the three water heaters tested at NIST which employed a single heating element, the first-hour rating results were significantly less, up to 30 percent, when the proposed test procedure was used as compared to the existing test procedure.

The first hour rating within the existing test procedure combines a measured quantity, the number of gallons removed during a single draw, with a computed quantity, the ability of the water heater to produce hot water within a given time interval. The computed quantity significantly over-predicts the capability of some water heaters, in particular, electric water heaters with a single element, to produce water above a prescribed temperature level. There are two reasons for this over-prediction. First, the computation procedure assumes that the energy supplied during the interval between the time at which the thermostat(s) acts to energize a heating element and the end of the hour is supplied only to the portion of water within the tank, which would be removed during a subsequent draw. This is a reasonably good assumption for electric water heaters which employ

dual elements, since the upper element is used to first heat the water in the upper portion of the water heater. However, for tanks which employ a single element, the water heater may not be able to elevate the temperature above the required minimum outlet temperature. Additionally, the calculation procedure does not take into account the mixing which occurs between the cold entering water and the water within the storage tank during the removal of hot water.

The first hour rating is gaining recognition as a sizing criterion for selecting water heaters. Because of this, the Department believes that it is beneficial to improve the accuracy of the test, as discussed above, especially the relative rankings to recognize water heater designs which improve the first hour rating. This would allow the selection of a "smaller" water heater which could meet the consumers needs and save energy by having smaller standby losses. Therefore, DOE is retaining the proposed first hour rating with one minor adjustment.

Through continuing testing at NIST, DOE discovered that under certain conditions the proposed first hour rating test could be non-repeatable because of thermostat variability. To preclude any unacceptable repeatability problems, DOE is today publishing a slightly revised first hour rating test procedure from that previously proposed. As published, if a draw is underway at the end of the hour, that draw is completed. However, if a draw is not underway, instead of drawing the tank down to T_{min} at that time, the test is continued until the tank recovers and then a final draw is performed. In both cases the water drawn over the total duration of the test is prorated to one hour.

Computation of Standby Losses

GAMA comments that the revised test procedure gives a significantly different measure of standby loss because of the shortened standby period. (GAMA, No. 87, at 3 and 4). GAMA states that although the standby loss measurement in the revised test procedure is adequate for the way in which it is utilized, it should not be used for other purposes outside the framework of the test procedure, since it is an abbreviated, less precise method in relation to the 48-hour standby loss test method within the current test procedure. GAMA contends that the inclusion of a specific calculation for standby loss in the revised test procedure is an implicit invitation to use this standby loss value for other purposes for which it is not suited. GAMA concludes that this term should be deleted.

GAMA is incorrect in stating that the reason the revised test procedure gives a different measure of standby loss, in comparison to the existing test procedure, is due to the decreased test duration. A different standby loss measurement is obtained because the inlet and outlet piping arrangement has been changed. In the proposed test procedure, two feet of vertical uninsulated copper piping are connected to both the inlet and outlet ports of the water heater. The existing test procedure utilizes insulated galvanized piping configured in such a manner as to form an external heat trap. In fact, GAMA clearly points out this difference and its impact on standby losses in its comments addressing the proposed amended energy conservation standards for electric water heaters. Accordingly, GAMA's recommendation is not adopted.

Section 6.1.4

GAMA states that it would simplify matters if an equation within section 6.1.4 were formulated in such a manner so that a number which is usually negative would not be subtracted from another number. (GAMA, No. 87, at 4).

GAMA is correct in noting that the form of the equation will usually result in a negative number being subtracted from another number. However, DOE believes that the form of the equation is more conceptually correct than that proposed by GAMA in that a higher ending tank temperature represents a positive energy input which is then subtracted. Additionally, DOE does not believe that the current equation is difficult to use and does not agree with changing the equations within section 6.1.4.

Off-Peak Water Heaters

The number of comments received by DOE concerning "off-peak" water heaters exceeded that on any other subject. American Electric Power, Appalachian Power Company, Columbus Southern Power, Indiana Michigan Power Company, Kentucky Power Company, Ohio Power Company, and Wheeling Power Company comment they are pleased that DOE intends to explore various concepts for testing these units. These utilities state that "off-peak" water heating is an important element in both their Energy Management and Load Management Programs. They also state that the current test procedure does not accurately show the energy conservation benefits provided by "off-peak" water heaters.

DOE contracted with NIST to test an electric "off-peak" type water heater using today's test procedure. The water heater was tested using several different "off-peak" schedules as well as a test in the normal fully-on mode. The result of these tests was that the energy factor essentially stayed constant regardless of whether the tank was tested "off-peak" or not. NIST thus concluded that there is no need for a test procedure which differs from today's test procedure to determine the energy factor of off-peak water heaters.

DOE recognizes that where off-peak electric rates are offered by utilities, customers may obtain economic benefits by using "off-peak" water heaters. However, based on the efficiency tests conducted by NIST, DOE has determined that today's test procedure is adequate to measure the energy factor of "off-peak" water heaters.

B. Standards

DOE is herein amending the energy efficiency standards for water heaters to reflect the changes necessitated by the revised test procedures. Several comments were received regarding the proposed revision to the standards and they are discussed below:

Rated Volume

The California Energy Commission (CEC) states that it presumes the allowable energy factor is computed by subtracting from a constant the product of a second constant times the measured volume. (CEC, No. 82 at 1 and 2). However, within the proposed rule, the term "rated storage volume" is used in the computation of the Federal energy conservation standards for water heaters. CEC further states that since the meaning of the term "rated volume" as commonly used in the industry is quite different from DOE's intent in the proposed rule, the word "rated" should be dropped from the rule. It also notes that footnote number one in the proposed standard referring to the definition of "rated storage volume" is referenced only to gas water heaters, not to oil or electric water heaters.

In a related matter, GAMA suggests that DOE adopt the following language as the definition for "rated storage volume": "The water storage capacity of a water heater as specified by the manufacturer." This definition would be substituted for the reference to the tank capacity measurements set forth in the current DOE water heater efficiency test procedures. (GAMA, No. 78, at 1).

At the time of the proposed rule, there was not a definition of "rated storage volume." It was DOE's intention to define "rated storage volume" as the measured volume for use in the

standard. However, upon further consideration, and for purposes of the instant rule, DOE accepts the arguments set forth in the comments regarding industry usage and has defined "rated storage volume" to mean the water storage capacity of a water heater, in gallons, as specified by the manufacturer, i.e., the "rated volume". Additionally, the footnote in the standard has been modified to indicate that this definition applies to all types of water heaters.

However, the Department has some concern about this use of "rated storage volume" in the standard because the measure of this quantity seems to be relatively uncontrolled and by specifying a large "rated volume" a manufacturer can lower the standard level that a water heater must meet. In oral testimony at the January 1989 public hearings, DOE staff pointed out that all the water heaters tested by NIST in support of this rule had measured volumes smaller than the "rated volume." GAMA staff replied that this difference was due to manufacturing tolerance. While DOE does not have enough data to be statistically significant, it questions whether the difference in rated and measured volume is due solely to manufacturing tolerance. If that were the case, one would expect some measured volumes to be above the "rated volume" and some to be below. All 13 water heaters tested had measured volumes lower than the "rated volume". Further, oral testimony by GAMA at the January, 1989 public hearings indicated that "the vast majority are below the rated number." However, at the same time, DOE is not aware of any evidence or data which suggests that abuse or consumer detriment has resulted from use of the definition advocated by the industry; and, the definition DOE is adopting for this rule has previously been adopted by the Z-21 Subcommittee on Standards for Gas Water Heaters.

Additionally, at the public hearings, DOE staff asked GAMA if there were limits as to how high the "rated volume" could be relative to the measured volume. It was stated that this difference was limited by adherence to the testing agency's specifications for safety. However, DOE notes that one of the six electric water heaters and one of the five gas water heaters tested by NIST in support of today's rule exceeded this limit. Thus, again some uncertainty exists with regard to which criterion to use.

As a consequence, DOE will continue to test water heaters and collect data on rated versus measured volume. Depending upon the results of those tests, as well as experience under the rule adopted today, DOE may consider revising the definition of "rated storage volume" in connection with the next water heater standards review.

Inclusion of Heat Pump Water Heaters

GAMA states that residential heat pump water heaters are included as a covered product in NAECA and that they are subject to minimum efficiency requirements. (GAMA, No. 78, at 1).

DOE agrees and notes that by establishing test procedures for heat pump water heaters, today's rule extends standards coverage to these products. DOE also notes that since heat pump water heaters use electric power, they are covered under the requirements for electric water heaters. DOE will consider separate standards for heat pump water heaters on the next review cycle for water heater standards in 1992.

Amended Energy Efficiency Standards

GAMA states that it agrees with the proposal to retain unchanged the conservation standards for gas and oil water heaters. (GAMA, No. 88). Testing, conducted at ETL for GAMA, yielded results which were consistent with DOE's data and the conclusion reflected in DOE's proposal for gas and oil water heaters. However, GAMA does not agree with the proposed amended energy conservation standards for electric water heaters. GAMA proposes that the minimum efficiency standard for residential electric water heaters be lowered by 0.04 rather than 0.02. GAMA states that while the average difference of all the test results from ETL is less than 0.04, the differences are greater for the small volume models. GAMA further states that since these small volume models represent the majority of electric water heater shipments, the adjustment should be weighted to acknowledge this. The models selected for the ETL tests, according to GAMA, represent less popular models or models with special design features, such as models factory equipped with heat traps, low-boy and table top models.

On the other hand, the American Gas Association (AGA) challenges DOE's proposal to lower the energy efficiency standard for electric water heaters. (AGA, No. 84). It believes that DOE selected an inadequate sample of electric water heaters to test under the amended test procedure and that the models selected by DOE are not truly representative of the universe of electric water heaters available. According to AGA, given these shortcomings in the amended test procedure's methodology, AGA does not believe that DOE can justify lowering the statutorily-established minimum efficiency standard for electric water heaters.

AGA urges DOE to conduct additional independent testing of water heaters to verify the differences in test methods before DOE amends the statutory minimum efficiency level. AGA states that the number of units tested at NIST represents less than 1 percent of the 1,000 basic models of electric water heaters available. AGA further states that testing should be performed on 20- and 100-gallon models and on models with high efficiency factors.

In closing, AGA states that it does not believe DOE has put forward sufficient justification to lower the statutory minimum standard for electric water heaters. AGA asserts that the DOE proposal has taken the expedient approach of lowering the statutory mandated minimum efficiency level rather than requiring electric water heaters to comply with the statute.

In response to GAMA and AGA, DOE notes that NAECA requires that efficiency standards shall be revised whenever the test procedures are revised so that units that minimally met the standards under the old test procedure will meet the revised standard under the new test procedure. In other words, a unit that met the standards under a test procedure is not allowed to fail to meet the standard just because the test procedure has changed. DOE agrees that the units tested are not representative of the complete universe of water heaters. However, under NAECA the models tested need not be representative of the entire product universe; rather they should be representative of those models which marginally comply with the standard. Because the effect of the test procedure on the majority of models which exceed the standards is not relevant to the pass-fail issue, the pertinent question thus is: what is the effect of the new test procedure on those models that only minimally meet the standard? The six electric units tested by NIST for DOE meet this criterion.

As stated above, GAMA submitted test results of several water heaters tested by ETL using both the old and revised test procedures to support its claim that the constant in the equation for the electric water heater standard should be lowered by 0.04. However, the units submitted by GAMA were not those marginally at the standard. Therefore, most of these test results are not applicable to the question at hand.

DOE recognizes that the number of marginal units tested is limited but believes that they fairly represent

marginal units and that using the average of these results is appropriate. The results of these tests were reported in the 1989 Proposal as Tables 1, 2, and 3. Therefore, DOE has elected to modify the standard as proposed in the 1989 Proposal by lowering the first term of the energy factor equation for electric water heaters by 0.02, which is the average reduction of the electric units tested, and by leaving the standard for oil and gas water heaters unchanged.

In selecting this standard based on average test results, it is recognized that some particular marginal water heaters might not meet the new standard.

It should be noted that any basic model that was manufactured before the effective date of today's final rule, regardless of when the individual unit was in fact manufactured, and which was certified as meeting the standard using the old test procedure, is grandfathered under NAECA as complying with today's standard.

DOE is also concerned over the test results obtained by NIST and those submitted by GAMA in that for the great majority of units tested, the measured values for energy factor were less than that reported in the GAMA directory. If this situation was brought to DOE's attention by one party complaining against another, DOE believes that in an enforcement proceeding the basic model could be found in noncompliance.

III. Correction of Effective Date for Mobile Home Furnaces Efficiency Standards

In reviewing the final rule regarding certification and enforcement of regulations related to energy conservation standards for consumer products published February 7, 1989, in the **Federal Register** (54 FR 6077), DOE noted that the effective date listed for mobile home furnaces efficiency standards, January 1, 1990, was incorrect. The correct date is September 1, 1990. Today's notice makes that correction.

IV. Other Reviews

A. Environmental Review

Pursuant to section 7(c)(2) of the Federal Energy Administration Act of 1974 (FEAA) (15 U.S.C. 761–790), a copy of this notice has been submitted to the Administrator of the Environmental Protection Agency for comments concerning the impact of this proposal on the quality of the environment.

Since the amended test procedures under the Program will be used only to standardize the measurement of energy usage and the energy efficiency standards have been adjusted accordingly to achieve no net change in energy usage, today's rule will not affect the quality or distribution of energy usage, and will not result in any environmental impacts. DOE, therefore, has determined that amending the test procedures and adjusting the energy efficiency standards accordingly under the Program do not individually or cumulatively have a significant effect on the human environment. Consequently, neither an Environmental Impact Statement nor an Environmental Assessment is required for today's rule.

B. Review Under Executive Order 12291

The final rule has been reviewed in accordance with Executive Order 12291, 46 FR 13193 (February 19, 1981), which directs that all regulations achieve their intended goals without imposing unnecessary burdens on the economy, on individuals, on public or private organizations, or on State and local governments. Executive Order 12291 also requires that regulatory impact analyses be prepared for "major rules," which it defines as any regulation that is likely to result in: (1) An annual effect on the economy of $100 million or more; (2) a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or (3) significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of the United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The final rule amends already existing test procedures for water heaters and correspondingly adjusts the energy efficiency standards. Accordingly, DOE has determined that any burden imposed on any person, industry, or government entity by the amendment of extant procedures is not significant enough to bring the final rule within the definition of "major rule."

In accordance with section 3(c)(3) of Executive Order 12291, which applies to rules other than major rules, the final rule was submitted to the Office of Management and Budget (OMB) for review without a regulatory impact analysis.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 601–612, requires that an agency prepare an initial regulatory flexibility analysis to be published at the time the proposed rule is published. This requirement (which appears in section 603) does not apply if the agency "certifies that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." DOE certified in the notice of proposed rulemaking, and does so again, that the rule, which affects manufacturers of water heaters, will not have significant economic impact, but rather simply improves the test procedures and adjusts the related energy efficiency standards accordingly. Therefore, DOE certifies that the final rule, as promulgated, will not have a "significant economic impact on a substantial number of small entities."

D. Federalism Review

Executive Order 12612, 52 FR 41685 (October 30, 1987), requires that regulations or rules be reviewed for any substantial direct effects on States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among various levels of government. If there are sufficient substantial direct effects, then Executive Order 12612 requires preparation of a Federalism assessment to be used in all decisions involved in promulgating and implementing a regulation or a rule.

By operation of the statute, standards under the Program initially preempt inconsistent State regulations. Thus, in theory these standards could be said to have a substantial direct effect on State governments. Today's water heater standards provisions, however, have the practical effect of maintaining the *status quo* of the statutory standards levels. Thus the revised standards provisions will have no added substantive or negative effect on States. Based on the foregoing, DOE has concluded that preparation of a Federalism assessment for this rulemaking was not warranted.

List of Subjects in 10 CFR Part 430

Administrative practice and procedure, Energy conservation, Household appliances.

In consideration of the foregoing, the Department of Energy amends part 430 of chapter II of title 10, Code of Federal Regulations, as set forth below.

Issued in Washington, DC, October 1, 1990.

J. Michael Davis,

Assistant Secretary, Conservation and Renewable Energy.

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

1. The authority citation for part 430 continues to read as follows:

Authority: Energy Policy and Conservation Act, title III, part B, as amended by National Energy Conservation Policy Act, title IV, part 2, National Appliance Energy Conservation Act of 1987, and National Appliance Energy

Conservation Amendments of 1988 (42 U.S.C. 6291–6309).

§ 430.22 [Amended]

2. Section 430.22 is amended by revising paragraphs (e)(1) and (e)(2) and by adding paragraph (e)(4) to read as follows:

* * * * *

(e) *Water Heaters.* (1) The estimated annual operating cost for water heaters shall be—

(i) For a gas or oil water heater, the product of the annual energy consumption, determined according to section 6.1.8 or 6.2.5 of appendix E of this subpart, times the representative average unit cost of gas or oil, as appropriate, in dollars per Btu as provided by the Secretary, the resulting product then being rounded off to the nearest dollar per year.

(ii) For an electric water heater, the product of the annual energy consumption, determined according to section 6.1.8 or 6.2.5 of appendix E of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour as provided by the Secretary, divided by 3412 Btu per kilowatt-hour, the resulting quotient then being rounded off to the nearest dollar per year.

(2) The energy factor for the water heaters shall be—

(i) For a gas or oil water heater, as determined by section 6.1.7 or 6.2.4 of appendix E of this subpart rounded off to the nearest 0.01.

(ii) For an electric water heater, as determined by section 6.1.7 or 6.2.4 of appendix E of this subpart rounded off to the nearest 0.01.

* * * * *

(4) The alternative uniform test method for measuring the energy consumption of untested water heaters shall be that set forth in section 7.0 of appendix E of this subpart.

3. Appendix E to subpart B of part 430 is revised to read as follows:

Appendix E to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Water Heaters

1. Definitions

1.1. *Cut-in* means the time or water temperature when a water heater thermostat has acted to increase the energy or fuel input to the heating elements, compressor, or burner.

1.2. *Cut-out* means the time or water temperature when a water heater thermostat has acted to reduce to a minimum the energy or fuel input to the heating elements, compressor, or burners.

1.3. *Design Power Rating* means the nominal power rating that a water heater manufacturer assigns to a particular design of water heater, expressed in kilowatts or Btu per hour as appropriate.

1.4. *Energy Factor* means a measure of water heater overall efficiency.

1.5. *First Hour Rating* means the amount of hot water the water heater can supply in one hour of operation.

1.6. *Heat Trap* means a device which can be integrally connected, or independently attached, to the hot and/or cold water pipe connections of a water heater such that the device will develop a thermal or mechanical seal to minimize the recirculation of water due to thermal convection between the water heater tank and its connecting pipes.

1.7. *Recovery Efficiency* means the ratio of energy delivered to the water to the energy content of the fuel consumed by the water heater.

1.8. *Standby* means the time during which water is not being withdrawn from the water heater. There are two standby time intervals used within this test procedure: $\tau_{stby,1}$ represents the elapsed time between the time at which the maximum mean tank temperature is observed after the sixth draw and the end of the 24 hour test; $\tau_{stby,2}$ represents the total time during the 24 hour simulated use test when water was not being withdrawn from the water heater.

1.9. *Gas fueled storage water heater* means a water heater which utilizes gas as the energy source and which is designed to heat and store water at a thermostatically controlled temperature of less than 180 °F with an input of 75,000 Btu per hour or less and a manufacturers specified storage capacity of not less than 20 gallons nor more than 100 gallons.

1.10 *Electric storage water heater* means a water heater which utilizes electricity as the energy source and which is designed to heat and store water at a thermostatically controlled temperature of less than 180 °F with an input of 12 kilowatts or less and a manufacturers specified storage capacity of not less than 20 gallons nor more than 120 gallons.

1.11 *Oil storage water heater* means a water heater which utilizes oil as the energy source and which is designed to heat and store water at a thermostatically controlled temperature of less than 180 °F with an energy input of 105,000 Btu per hour or less, and which has a manufacturers specified storage capacity of 50 gallons or less.

1.12 *Gas fueled instantaneous water heater* means a water heater which utilizes gas as the energy source controlled manually or automatically by a water flow activated control or a combination of water flow and thermostatic control, which is designed to deliver water at a controlled temperature of less than 180 °F, and which has an input greater than 50,000 Btu per hour and less than 200,000 Btu per hour, and a manufacturers specified storage capacity of less than 2 gallons.

1.13 *Heat pump water heater* means a water heater which utilizes electricity as the energy source with a maximum current rating of 24 amperes at a voltage no greater than 250 volts, and which is designed to transfer thermal energy from one temperature level to a higher temperature level for the purpose of heating water, including all auxiliary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function.

1.14 *ASHRAE Standard 41.1–86* means the standard published in 1986 by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. and titled Standard Measurement Guide: Section on Temperature Measurements.

1.15. *ASTM–D–2156–80* means the test standard published in 1980 by the American Society of Testing and Measurements and titled Method for Smoke Density in Flue Gases from Burning Distillate Fuels.

1.16. "Rated Storage Volume" means the water storage capacity of a water heater, in gallons, as specified by the manufacturer.

2. Test Conditions

2.1. *Installation Requirements.* Tests shall be performed with the water heater and instrumentation installed in accordance with section 4.

2.2. *Ambient Air Temperature.* The ambient air temperature, shall be controlled to a value between 65.0 °F and 70.0 °F on a continuous basis. For heat pump water heaters maintain the dry bulb temperature at 67.5 ± 1 °F. Additionally, for heat pump water heaters the relative humidity shall be maintained between 49 and 51 percent.

2.3. *Supply Water Temperature.* The temperature of the water being supplied to the water heater shall be maintained at 58 ± 2 °F throughout the test.

2.4. *Storage Tank Temperature.* The average temperature of the water within the storage tank shall be set to 135 ± 5 °F.

2.5. *Supply Water Pressure.* During the test when water is not being withdrawn, the supply pressure shall be maintained between 40 psig and the maximum allowable pressure specified by the water heater manufacturer.

2.6. *Electrical and/or Fossil Fuel Supply.*

2.6.1. *Electrical.* Maintain the electrical supply voltage to within ± 1 percent of the center of the voltage range specified by the water heater and/or heat pump manufacturer.

2.6.2. *Natural Gas.* Maintain the supply pressure in accordance with the manufacturer's specifications. If the supply pressure is not specified, maintain a supply pressure of 7 to 10 inches of water column. If the water heater is equipped with a gas appliance pressure regulator, the regulator outlet pressure shall be within ± 10% of the manufacturer's specified manifold pressure. Use natural gas with a higher heating value of approximately 1,025 Btu per standard cubic foot.

2.6.3. *Propane Gas.* Maintain the supply pressure in accordance with the manufacturer's specifications. If the supply pressure is not specified, maintain a supply pressure of 11 to 13 inches of water column. If the water heater is equipped with a gas appliance pressure regulator, the regulator outlet pressure shall be within ± 10% of the manufacturer's specified manifold pressure. Use propane gas with a higher heating value of approximately 2,500 Btu per standard cubic foot.

2.6.4. *Fuel Oil Supply.* Maintain an uninterrupted supply of fuel oil. Use fuel oil

with a heating value of approximately 138,700 Btu per gallon.

3. Instrumentation

3.1. *Pressure Measurements.* Pressure measuring instruments shall have an error no greater than the following values:

Item measured	Instrument accuracy	Instrument precision
Gas pressure	±0.1 inch of water column.	±0.05 inch of water column
Atmospheric pressure.	±0.1 inch of mercury column.	±0.05 inch of mercury column
Water pressure	±1.0 pounds per square inch.	±0.50 pounds per square inch

3.2. Temperature Measurement

3.2.1. *Measurement.* Temperature measurements shall be made in accordance with the Standard Measurement Guide: Section on Temperature Measurements, ASHRAE Standard 41.1–86.

3.2.2. *Accuracy and Precision.* The accuracy and precision of the instruments, including their associated readout devices, shall be within the limits as follows:

Item measured	Instrument accuracy	Instrument precision
Air dry bulb temperature	±0.2°F	±0.1°F
Air wet bulb temperature	±0.2°F	±0.1°F
Inlet and outlet water temperatures	±0.2°F	±0.1°F
Storage tank temperatures	±0.5°F	±0.25°F

3.2.3. *Scale Division.* In no case shall the smallest scale division of the instrument or instrument system exceed 2 times the specified precision.

3.2.4. *Temperature Difference.* Temperature difference between the entering and leaving water may be measured with any of the following:

a. A Thermopile
b. Calibrated resistance thermometers
c. Precision thermometers
d. Calibrated thermistors
e. Calibrated thermocouples
f. Quartz thermometers

3.2.5. *Thermopile Construction.* If a thermopile is used, it shall be made from calibrated thermocouple wire taken from a single spool. Extension wires to the recording device shall also be made from that same spool.

3.2.6. *Time Constant.* The time constant of the instruments used to measure the inlet and outlet water temperatures shall be no greater than 5 seconds.

3.3 *Liquid Flow Measurements.* The accuracy of the liquid flow rate measurement, using the calibration if furnished, shall be equal to or less than ± 1% of the measured value in mass units per unit time.

3.4. *Electric Energy.* The electrical energy used shall be measured with an instrument and associated readout device that are accurate within ± 1% of the reading.

3.5. *Fossil Fuels.* The quantity of fuel used by the water heater shall be measured with an instrument and associated readout device that is accurate within ± 1% of the reading.

3.6. *Mass Measurements.* Mass measurements shall be made measured with instruments that are accurate within ± 1% of the reading or 0.1 lbm, whichever is greater.

3.7. *Heating Value.* The higher heating value of the natural gas, propane, or fuel oil shall be measured with an instrument and associated readout device that is accurate within ± 1% of the reading. The heating value of natural gas and propane must be corrected for local temperature and pressure conditions.

3.8. *Time.* The elapsed time measurements shall be measured with an instrument that is accurate within ± 0.5 seconds per hour.

4. Installation

4.1. *Water Heating Mounting.* A water heater designed to be free standing shall be installed according to the manufacturer's directions on a ¾ inch thick plywood platform supported by three 2 × 4 inch runners. If the water heater is not approved for installation on combustible flooring, suitable non-combustible material shall be placed between it and the platform. For heat pump water heaters without a storage tank supplied by the manufacturer, connections shall be made with a storage tank as described in section 4.9.3 and in accordance with manufacturer-published installation instructions. The storage tank and heat pump section shall be placed on platform(s) constructed as previously described. If installation materials are not provided by the heat pump manufacturer, use uninsulated 8 foot long connecting hoses, having an inside diameter of ⅜ inch. Wall mounted water heaters shall be installed in accordance with manufacturer-published installation instructions on a simulated wall section made from ¾ inch plywood and 2 × 4 inch studs. Placement in the test room shall be in an area protected from drafts.

4.2. *Water Supply.* The water supply shall be capable of delivering water at conditions as specified in section 2.

4.3. *Water Inlet and Outlet Configuration.* Inlet and outlet piping connections shall be configured as illustrated in Figures 1, 2, or 3 except a water heater 36 inches high or less, (commonly referred to as an under counter or table top model) intended for installation either beneath, adjacent to or in conjunction with a counter shall have the inlet and outlet connections configured as illustrated in Figures 4a and 4b. Type "L" hard copper tubing, the same size as the connections on the water heater shall be connected to the tank and extend 24 inches in length. If a water heater 36 inches high or less is not factory equipped with pipe to extend the field connection point of the water heater lines to outside of the jacket or cabinet, type "L" hard copper tubing shall be used to extend the water line horizontally to the exterior of the jacket or cabinet. Unions may be utilized to facilitate installation and removal of the piping arrangements. A pressure gauge and diaphragm expansion tank shall be installed in the supply water piping at a location upstream of the 24 inch cold water inlet pipe. An appropriately rated pressure and temperature relief valve shall be installed on all water heaters at the port specified by the manufacturer. Discharge piping for the relief valve shall be non-metallic. If heat traps and/or piping insulation and/or pressure relief valve insulation are supplied with the water heater, then they shall be installed for testing. Clearance shall be provided such that none of the piping contacts other surfaces in the test room.

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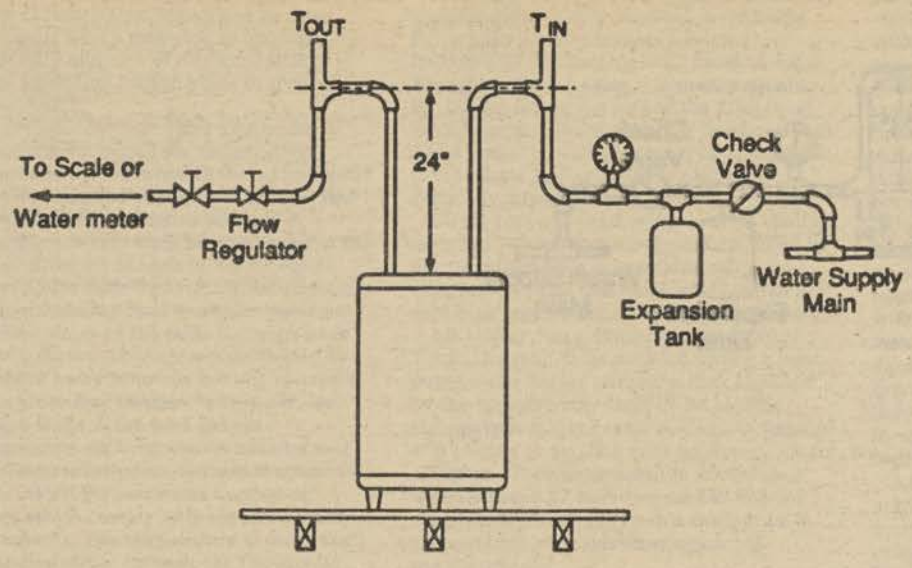

Figure 1

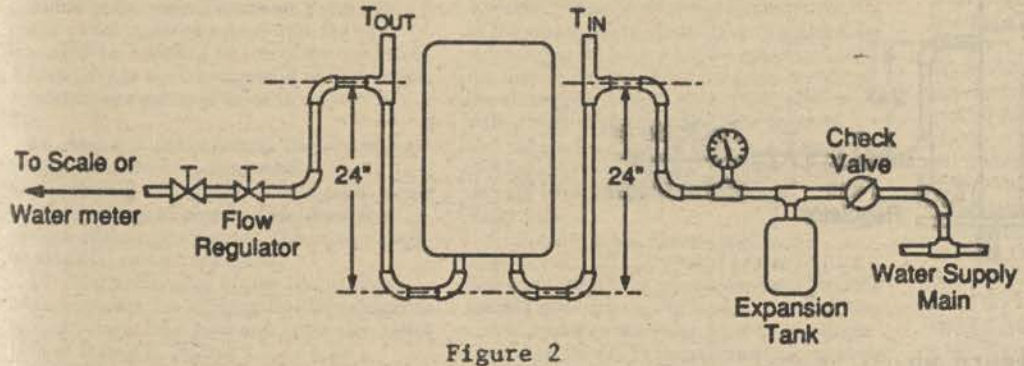

Figure 2

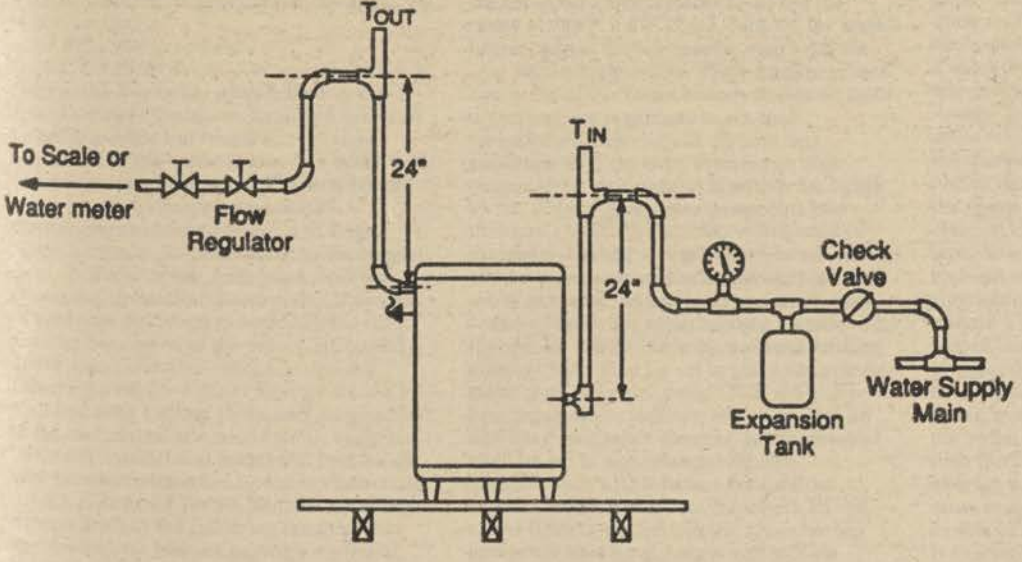

Figure 3

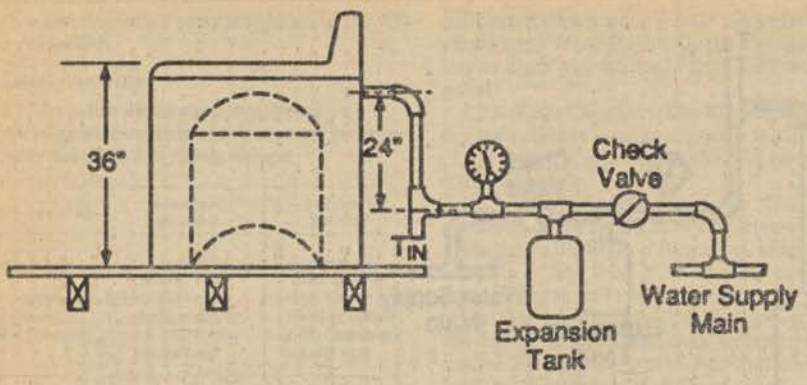

Figure 4a.

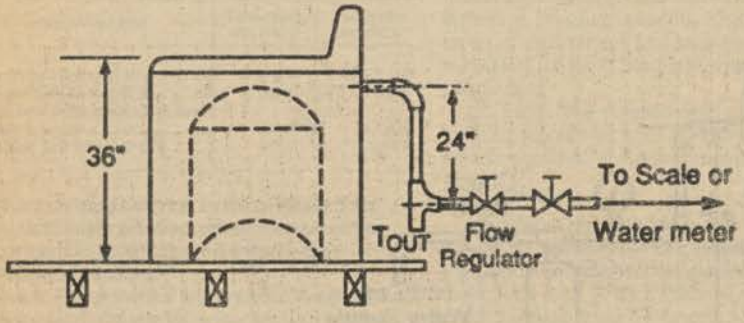

Figure 4b.

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4.4. *Fuel and/or Electrical Power and Energy Consumption.* Install one or more instruments which measure, as appropriate, the quantity and rate of electrical energy and/or fossil fuel consumption in accordance with section 3.

4.5. *Internal Storage Tank Temperature Measurements.* Install six temperature measurement sensors inside the water heater tank with a vertical distance of at least four inches between successive sensors. A temperature sensor shall be positioned at the vertical midpoint of each of the six equal volume nodes with the tank. Nodes designate the equal volumes used to evenly partition the total volume of the tank. As much as is possible, the temperature sensor should be positioned away from any heating elements, anodic protective devices, tank walls, and flue pipe walls. If the tank cannot accommodate six temperature sensors and meet the installation requirements specified above, install the maximum number of sensors which comply with the installation requirements. The temperature sensors shall be installed either through: (1) The anodic device opening; (2) the relief valve opening; or (3) the hot water outlet. If installed through the relief valve opening or the hot water outlet, a tee fitting or outlet piping, as applicable, shall be installed as close as possible to its original location. If the hot water outlet includes a heat trap, the heat trap shall be installed on top of the tee fitting. Added fittings shall be covered with thermal insulation having an R value of 4 hr-ft²-°F/Btu.

4.6. *Ambient Temperature.* The ambient air temperature shall be measured approximately at the vertical mid-point of the heater and approximately 2 feet from the surface of the water heater. The sensor shall be shielded against radiation.

4.7. *Inlet and Outlet Water Temperature Measurements.* Install temperature sensors in the cold-water inlet pipe and hot-water outlet pipe as shown in Figures 1, 2, or 3, as applicable.

4.8. *Flow Control.* A flow control valve shall be installed to provide flow as specified within section 5.

4.9. *Flue Requirements.*

4.9.1. *Oil-Fired Water Heaters.* Establish a draft at the flue collar as specified in the manufacturer's literature. Establish the draft by using a sufficient length of vent pipe connected to the water heater flue outlet and directed vertically upward. For an oil-fired water heater having a horizontally discharging draft hood outlet, a 90 degree elbow having a diameter equal to the largest flue collar size of the draft hood shall be connected to the draft hood outlet. A length of vent pipe sufficient to establish the draft shall be connected to the elbow fitting and oriented to discharge vertically upward. Direct vent oil-fired water heaters should be installed with venting equipment as specified in the manufacturer's instructions, using the minimum vertical and horizontal lengths of vent pipe recommended by the manufacturer.

4.9.2. *Gas-Fired Water Heaters.* Establish a natural draft in the following manner. For gas-fired water heaters having a vertically discharging draft hood outlet, a 5 foot vertical vent pipe extension having a diameter equal to the largest flue collar size of the draft hood shall be connected to the draft hood outlet. For gas-fired water heaters having a horizontally discharging draft hood outlet, a 90 degree elbow having a diameter equal to the largest flue collar size of the draft hood shall be connected to the draft hood outlet. A 5 foot length of vent pipe shall be connected to the elbow and oriented to discharge vertically upward.

Direct vent gas-fired water heaters shall be installed wth venting equipment specified in the manufacturer's instructions using the minimum vertical and horizontal lengths of vent pipe recommended by the manufacturer.

4.9.3. *Heat Pump Water Heater Storage Tank.* The tank to be used for testing a heat pump water heater without a tank supplied by the manufacturer shall be an electric storage type water heater having a volume of 47.0 gallons ± 1 gallon with an Energy Factor of 0.87 ± .01 as determined in accordance with section 6.1.7 with two 4.5 kW heating elements controlled in such a manner as to prevent both elements from operating simultaneously.

5. Test Procedures

5.1. *Storage Tank and Heat Pump Water Heaters.*

5.1.1. *Determination of Storage Tank Volume.* Determine the storage capacity, V_{st}, of the water heater under test, in gallons, by subtracting the tare weight—measured while the tank is empty—from the gross weight of the storage tank completely filled with water with all air eliminated and line pressure applied as described in section 2.5. and dividing the resulting net weight by the density of water at the appropriate temperature.

5.1.2. *Setting the Thermostat for a Thermostatically Operated Water Heater.* Starting with a tank of supply water, initiate normal operation of the water heater. After cutout, observe the mean tank temperature (based on the six temperature sensors) every minute until the maximum value is observed. Determine whether this maximum value of the mean tank temperature is within the range of 135°F ±5°F. If not, turn off the water heater, adjust the thermostat, and refill the tank with supply water. Then, initiate normal operation of the water heater, and once again determine the maximum mean tank temperature after cut-out. Repeat this sequence until the maximum mean tank temperature after cut-out is within the range of 135°F ±5°F. If a water heater has two thermostats, the thermostat which controls the upper heating element shall be set first to yield a maximum water temperature of 135°F ±5°F as measured by the temperature tank sensors above the upper heating element. The thermostat which controls the lower heating element shall then be set to yield a maximum mean tank temperature of 135°F ±5°F. For heat pump water heaters, which control an auxiliary resistance element, the thermostat shall be set in accordance with the manufacturer's installation instructions.

5.1.3. *Power Input Determination.* For all water heaters except electric types having immersed heating elements and initiate normal operation and determine the power input, P, to the main burners (including pilot light power, if any) after 15 minutes of operation. If the water heater is equipped with a gas appliance pressure regulator, the regulator outlet pressure shall be set within ±10% of that recommended by the manufacturer. For oil fired water heaters the fuel pump pressure shall be within ±10% of the manufacturer's specified pump pressure. All burners shall be adjusted to achieve an hourly Btu rating that is within ±2% of the value specified by the manufacturer. For an oil-fired water heater, adjust the burner to give a CO_2 reading recommended by the manufacturer and an hourly Btu rating that is within ±2% of that specified by the manufacturer. Smoke in the flue may not exceed No. 1 smoke as measured by the procedure in ASTM–D–2156–80. Gas- and oil-fired water instantaneous water heaters shall have the burners adjusted to the manufacture's maximum firing rate value.

5.1.4. *First Hour Rating Test.* Establish normal water heater operation with the maximum mean tank temperature within the range specified in section 2.1.4. Begin the first hour rating test after the thermostat has acted to reduce the electrical power or fuel input to the water heater and the maximum storage tank temperature has been achieved. If the water heater incorporates a heat-pump, wait until both the heat pump and electrical heating element(s) have ceased to supply energy to the storage tank. Record the time, oil, gas and/or electrical meter readings as appropriate. Do not interrupt electrical power and/or fuel to the water heater. The rate of water withdrawal shall be 3.00±0.25 gallons per minute. Draw and collect water withdrawn from the water heater in a suitable container for the purpose of determining its weight at the conclusion of the test. During the draw record the inlet and outlet fluid temperature beginning 15 seconds after the start and at every subsequent 5 second interval throughout the duration of each draw. Alternatively, a water meter may be used to directly measure the volume of water withdrawn. Record the maximum outlet temperature which occurs during the draw as T_{max}. The withdrawal of water shall continue until the outlet temperature drops to a value 25°F below T_{max}, defined as T_{min}, at which time the draw shall be terminated. Record the average outlet temperature and mass removed as $T_{del,1}$ and M_1, respectively. If the thermostat acts to reduce the supply of fuel to the main burner or electrical input to the upper heating element of a multiple element electric water heater, or electrical input to a water heater having a single element or multiple elements which operate simultaneously, before one hour has elapsed, initiate a second draw. During the draw record the outlet fluid temperatures beginning 15 seconds after initiating the draw and at every subsequent 5 second interval throughout the duration of each draw until the outlet temperature drops to T_{min}, at which time the draw is terminated. Record the average outlet temperatures as well as the mass removed. Continue this sequence of events until one hour has elapsed. If a draw is currently taking place, continue the draw until the outlet temperature reaches T_{min}, and record the elasped time between the

previously recorded time, at the beginning of the first draw, and the termination of this final draw as τ_{fhr}. If a draw is not taking place at the end of one hour, wait until the thermostat acts to reduce the supply of fuel to the main burner or electrical input to the upper heating element of a multiple element electric water heater, or electrical input to a water heater having a single element or multiple elements which operate simultaneously, to initiate the final draw. During the final draw, record the outlet fluid temperature beginning 15 seconds after initiating the draw and at every subsequent 5 second intervals throughout the duration of the draw until the outlet temperature drops to T_{min}, at which time the draw is terminated. Record the elasped time between the previously recorded time, at the beginning of the first draw, and the termination of the final draw as τ_{fhr}. In either case, record the outlet temperatures and the mass removed during the final draw.

5.1.5. *24 Hour Simulated Use Test.* During the simulated use test, a total of 64.3 gallons are removed. With the water heater turned off, fill the water heater with supply water and apply pressure as described in section 2.1.5. Turn on the water heater and associated heat pump unit, if present. Wait until cutout occurs at 135°F ±5°F, as specified in section 2.1.4. After the cutout occurs, measure the mean tank temperature using the temperature sensors described in section 4.5 every minute until the maximum mean storage tank temperature is achieved. The water heater may be operated through up to three successive cycles of drawing 10 gallons per draw, permitting recovery between each draw, prior to the start of the test. Record at this time (designated as $\tau=0$), the mean tank temperature ($\overline{T}_o$), and the oil, gas, and electrical energy measurements as appropriate. Begin the 24 hour simulated use test by drawing an amount of water out of the water heater equivalent to one-sixth of the daily hot water usage, 64.3 gallons. Record the average storage tank and ambient temperature every 15 minutes throughout the 24 hour simulated use test unless recovery or a draw is occurring. At elapsed time intervals of one, two, three, four and five hours from $\tau=0$), initiate additional draws removing an amount of water equivalent to one-sixth of 64.3 gallons, with the maximum allowable deviation for any single draw being ±0.5 gallons. The quantity of water drawn during the sixth draw shall be increased or decreased as necessary such that the total volume of water withdrawn shall be equal to 64.3±1.0 gallons.

All draws during the simulated use test are to be made at flow rates of 3.0±0.25 gallons per minute. Measurements of the inlet and outlet temperatures shall be made beginning 15 seconds after the draw is initiated and at every subsequent 5 second interval throughout the duration of each draw. The airithmetic mean of the hot water discharge temperature and the cold water inlet temperature shall be determined for each draw. Record the scale or meter reading, as appropriate, after each draw. At the end of the recovery period following the first draw, record the maximum mean tank temperature observed after cut-out, $T_{max,1}$, and the energy consumed, Q_r for oil, gas, and heat pump water heaters including auxiliary energy such as pilot lights, pumps, fans, etc. For heat pump water heaters Q_r, is the sum of the energy consumed by the heat pump and the electrical heating elements(s).

At the end of the recovery period following the sixth draw, record the total electric and/or fuel energy consumption, Q_{su}, and the scale reading or the meter reading, as appropriate. If a water scale is used, determine the net weight of the water withdrawn, M_{FHR} in pounds. Record the maximum value of the mean tank temperature after cutout as $\overline{T}_{su}$. Except as noted below, allow the water heater to remain in the standby mode until 24 hours have elapsed from the start of the test, $\tau=0$. Prevent the water heater from beginning a recovery cycle during the last hour of the test by turning off the electric power to the electrical heating elements and heat pump, if present, or by turning down the fuel supply to the main burner at an elapsed time of 23 hours. If a recovery is taking place at an elapsed time of 23 hours, wait until the recovery is complete before reducing the electrical and/or fuel supply to the water heater. At 24 hours, record the mean tank temperature, $\overline{T}_{24}$, and the electric and/or fuel instrument readings. Determine the total energy consumption during the entire 24 hour simulated use test, Q. Record the time interval between the time at which the maximum mean tank temperature is observed after the sixth draw and the end of the 24 hour test as $\tau_{stby,1}$. Record the time during which water was not being withdrawn from the water heater during the entire 24 hour period as $\tau_{stby,2}$.

5.2 Instantaneous Water Heaters

5.2.1. *Setting the Outlet Discharge Temperature.* Initiate normal operation of the water heater at the full input rating. Monitor the discharge water temperature and set to a value of 135°F ± 5°F in accordance with the manufacturer's instructions. If the water heater is not capable of providing 3.00 ± 0.25 gallons per minute then adjust the flow rate as necessary to achieve the specified discharge water temperature. Record the corresponding flow rate as V_{max}. If the instantaneous water heater incorporates a controller which permits continous burner operation at a reduced input rate, adjust the flow rate as necessary to achieve a discharge water temperature of 135° ± 5°F while maintaining the minimum input rate. Record the corresponding flow rate, V_{min}. If an outlet temperature of 135° ± 5°F cannot be achieved at the minimum allowable flow rate permitted by the instantaneous water heater, record the flow rate as V_{min} and the outlet temperature as T_{min}.

5.2.2. *Power Input Determination.* For oil and gas flow actuated water heaters, adjust the burners to the maximum firing rate value specified by the manufacturer.

5.2.3. *First Hour Rating Test for Instantaneous Water Heaters.* Establish normal heater operation at the maximum input rate with the discharge water temperature set in accordance with section 5.2.1. Record the time, oil, and/or gas meters as appropriate. Do not interrupt electrical or fuel to the water heater. Draw and collect water withdrawn from the water heater, while recording the inlet and outlet fluid temperatures beginning 15 seconds after the draw is initiated and at every subsequent 5 second interval throughout the duration of the draw in a suitable container for the purpose of determining its weight at the conclusion of the test. Alternatively, a water meter may be used to directly measure the value of water withdrawn. At the end of one hour terminate the draw. Determine the mass of water withdrawn, M_{FHR}, in pounds, or the volume of water withdrawn, V_{FHR}, in gallons with an error no greater than 2 percent.

5.2.4. 24 Hour Simulated Use Test

5.2.4.1. *Fixed Input Instantaneous Water Heaters.* Establish normal operation with the discharge water temperature and flow rate set to values of 135°F ± 5°F and V_{max}, respectively. Record the oil, gas, and electrical energy measurements, as appropriate. Begin the 24 hour simulated use test by drawing an amount of water out of the water heater equivalent to one-sixth of the daily not water usage, 64.3 gallons. At elapsed time intervals of one, two, three, four, and five hours from $\tau=0$, initiate additional draws removing an amount of water equivalent to one-sixth of 64.3 gallons, with the maximum allowable deviation for any single draw being ± 0.5 gallons. The quantity of water drawn during the sixth draw shall be increased or decreased as necessary such that the total volume of water withdrawn shall be equal to 64.3±1.0 gallons. Measurements of the inlet and outlet water temperatures shall be made beginning 15 seconds after the draw is initiated and at every 5 second interval throughout the duration of the draw. The arithmetic mean of the hot water discharge temperature and the cold water inlet temperature shall be determined for each draw. Record the scale or meter reading, as appropriate, after each draw. At the end of the recovery period following the first draw, record the energy consumed, Q_r. Allow the water heater to remain in the standby mode until exactly 24 hours have elapsed from the start of the test, $\tau=0$. At 24 hours, record the electric and/or fuel instrument readings. Determine the energy consumption during the entire 24 hour simulated use test, Q.

5.2.4.2. *Variable Input Instantaneous Water Heaters.* If the instantaneous water heater incorporates a controller which permits continuous burner operation at a reduced input rate, the first three draws shall be conducted using the maximum flow rate, V_{max}, while removing an amount of water equivalent to one-sixth of 64.3 gallons, with the maximum allowable deviation for any one of the three draws being ± 0.5 gallons. The second three draws shall be conducted at V_{min}. If an outlet temperature of 135° ± 5°F could not be achieved at the minimum flow rate permitted by the instantaneous water heater, the last three draws should be lengthened such that the volume removed is equivalent to

$$V_{4.5.6} = \frac{64.3}{6} * \left[\frac{77°F}{T_{min} - 58°F} \right]$$

with the maximun allowable definition for any one of the three draws being ± 0.5 gallons. The quantity of water drawn during the sixth draw shall be increased or decreased as necessary such that the total volume of water withdrawn shall be equal to $32.15 + 3*V_{4.5.6} \pm 1.0$ gallons. Measurements of the inlet and outlet water temperatures shall be made beginning 15 seconds after the draw is initiated and at every 5 second interval throughout the duration of the draw. Determine the arithmetic mean of the hot water discharge temperature and the cold water inlet temperature for each draw. Record the scale or meter reading, as appropriate, after each draw. At the end of the recovery period following the first draw, record the energy consumption, $Q_{r,\ max}$. Record the energy consumed prior to the fourth draw and at the end of the recovery period following the fourth draw, $Q_{r,\ min}$.

Allow the water heater to remain in the standby mode until exactly 24 hours have elapsed from the start of the test, $\tau = 0$. At 24 hours, record the electric and/or fuel instrument readings. Determine the energy consumption during the entire 24 hours simulated use test, Q.

6. Computations

6.1 *Storage Tank Water Heaters.*

6.1.1. *Storage Tank Capacity.* The storage tank capacity is computed using the following—

$$V_{st} = (W_f - W_t)/\rho$$

where V_{st} is the storage capacity of the water heater, gallons

W_f is the weight of the storage tank completely filled with water, 1bm

W_t is the tare weight of the empty storage tank, 1bm

ρ is the density of water at the appropriate temperature, 1bm/gal.

6.1.2. First Hour Rating Computation. Compute the first hour rating as

$$F_{hr} = \frac{60}{\tau_{fhr}} \sum_{i=1}^{n} \frac{M_i(T_{del.\ i} - T_{in.i})}{\rho(135°F - 58°F)}$$

Which may be expressed as

$$F_{hr} = \frac{60}{\tau_{fhr}} \sum_{i=1}^{n} \frac{M_i(T_{del.\ i} - T_{in.i})}{\rho(77°F)}$$

where M_i represents the mass removed during the ith draw of the first hour rating test, 1bm

$T_{del.\ i}$ is the average delivery temperature for the ith draw which occurred during the first hour rating test, °F

τ_{fhr} represents the elasped time recorded during the first hour rating test, minutes

$\bar{T}_{in.i}$ is the average inlet temperature for the ith draw which occurred during the first hour rating test, °F

ρ represents the density of water at the average delivery temperature, lbm/gal

and n represents the number of draws which occur during the test If a water meter is used in lieu of a scale, the first hour rating is

$$F_{hr} = \frac{60}{\tau_{fhr}} \sum_{i=1}^{n} \frac{V_i(\bar{T}_{del.i} - \bar{T}_{in.i})}{77°F}$$

where V_i represents the volume removed during the ith draw of the first hour rating test, gal

6.1.3 *Recovery Efficiency.* The recovery efficiency for gas, oil, and heat pump storage type water heaters is computed as

$$\eta_r = \frac{M_1 C_{p1}(\bar{T}_{del.1} - \bar{T}_{in.1})}{Q_r} + \frac{V_{st}\rho C_{p2}(T_{max.1} - \bar{T}_o)}{Q_r}$$

where M_1 is the mass withdrawn during the first draw, lbm

C_{p1} is the specific heat of water at the average temperature $(\bar{T}_{del.1} + T_{in.1})/2$, btu/lbm °F

$\bar{T}_{del.1}$ is the average delivery temperature for the first draw, °F

$\bar{T}_{in.1}$ is the average inlet temperature for the first draw, °F

V_{st} is the storage tank capacity, gal

ρ is the density of water at the average temperature $(T_{max.1} + \bar{T}_o)/2$, lbm/gal

C_{p2} is the specific heat of water at the average temperature $(T_{max.1} + \bar{T}_o)/2$, Btu/lbm °F

$T_{max.1}$ is the maximum mean tank temperature recorded after cutout following the first draw, °F

$\bar{T}_o$ is the maximum mean tank temperature recorded prior to the first draw, °F

and Q_r is the total energy used by the water heater between cutout prior to the first draw and cutout following the first draw, including auxiliary energy such as pilot lights, pumps, fans, etc., Btu. (Electrical auxiliary energy shall be converted to thermal energy using the following conversion: 1kWh = 3412.76 Btu.)

The recovery efficiency for electric water heaters with immersed heating elements is assumed to be 98 percent.

6.1.4. *Hourly Standby Losses.* The hourly standby losses are computed as

$$Q_{hr} = \left[Q_{stby} - \frac{MC_p(\bar{T}_{24} - T_{su})}{\eta_r} \right] \Big/ \tau_{stby.1}$$

where Q_{hr} is the hourly standby energy losses of the water heater, Btu/hr

Q_{stby} is the total energy consumer by the water heater between the time at which the maximum mean tank temperature is observed after the sixth draw and the end of the 24 hour test period, Btu

M is the mass of the water within the storage tank, lbm

C_p is the specific heat of water at the average temperature $(\bar{T}_{24} + \bar{T}_{su})/2$, Btu/lbm °F

$\bar{T}_{24}$ is the mean tank temperature at the end of the 24 hour test period, °F

$\bar{T}_{su}$ is the maximum mean tank temperature observed after the sixth draw, °F

and $\tau_{stby.1}$ is the elapsed time between the time at which the maximum mean tank temperature is observed after the sixth draw and the end of the 24 hour test period, hours

The standby heat loss coefficient for the tank is computed as—

$$UA = \frac{Q_{hr}}{T_{t.stby} - T_{a.stby}}$$

where $\bar{T}_{t.stby}$ is the average storage tank temperature between the time at which the maximum mean tank temperature is observed after the sixth draw and the end of the 24 hour test period, °F

$\bar{T}_{a.stby}$ is the average ambient temperature between the time at which the maximum mean tank temperature is observed after the sixth draw and the end of the 24 hour test period, °F

and UA is the standby heat loss coefficient of the storage tank,

$$\frac{BTU}{hr\ ^\circ F}$$

6.1.5. Daily Water Heating Energy Consumption. The daily water heating energy consumption, Q_d is computed as

$$Q_d = Q - \frac{C_p M(\bar{T}_{24} - \bar{T}_o)}{\eta_r}$$

where Q is the total energy used by the water heater during the 24 hours simulated use test including auxiliary energy such as pilot lights, pumps, fans, etc., Btu

C_p is the specific heat of water at the average temperature $(\bar{T}_{24} + \bar{T}_o)/2$, Btu/lbm °F

M is the mass of water within the storge tank, lbm

$\bar{T}_{24}$ is the average tank temperature at the conclusion of the 24 hours simulated use test, °F

$\bar{T}_o$ is the average tank temperature at the beginning of the 24 hours simulated use test, recorded one minute before the first draw is initiated °F

and η_r is the recovery efficiency of the hot water heater, dimensionless.

6.1.6. *Adjusted Daily Water Heating Energy Consumption.* The adjusted daily water heating energy consumption, Q_{da} takes into account that the temperature difference between the storage tank and surrounding ambient temperature may not be the nominal value of 67.5°F (135°F − 67.5°F) due to the 10°F allowable variation in storage tank temperature, 135 ± 5°F, and the 5°F allowable variation in surrounding ambient temperature 65°F to 70°F. The adjusted daily water heating energy consumption is computed as

$$Q_{da} = Q_d - [(\bar{T}_{stby} - \bar{T}_{a\text{-}stby}] - (135°F - 67.5°F)]UA\tau_{stby,2}$$

where Q_{da} is the adjusted daily water heating consumption, Btu

$\bar{T}_{stby}$ is the mean tank temperature during the total standby portion, $\tau_{stby,2}$, of the 24 hour test, °F

$\bar{T}_{a\text{-}stby}$ is the average ambient temperature during the total standby portion, $\tau_{stby,2}$, of the 24 hour test, °F

UA is the standby heat loss coefficient for the storage tank, Btu/hr°F

and $\tau_{stby,2}$ is the number of hours during the 24 hour simulated test when water was not being withdrawn from the water heater

A modification is also needed to take into account that the temperature difference between the outlet water temperature and supply water temperature may not be equivalent to the nominal value of 77°F (135°F − 58°F). The following equations adjust the experimental data to a nominal 77°F temperature rise.

The energy used to heat water, Btu per day, may be computed as—

$$Q_{HW} = \sum_{i=1}^{6} \frac{M_i C_{pi}(\bar{T}_{del,i} - T_{in,i})}{\eta_r}$$

where M_i is the mass withdrawn for the ith draw (i=1 to 6), lbm

C_{pi} is the specific heat of water, Btu/lbm °F

The energy required to heat the same quantity of water over a 77 °F temperature rise, Btu per day, is

$$Q_{HW,77} = \sum_{i=1}^{6} \frac{M_i C_{pi}(135\ ^\circ F - 58\ ^\circ F)}{\eta_r}$$

The difference between these two values is—

$$Q_{HWD} = Q_{HW,77} - Q_{HW}$$

which must be added to the adjusted daily water heating energy consumption value. Thus, the daily energy consumption value which takes into account that the temperature difference between the storage tank and ambient temperature may not be 67.5°F and the temperature rise across the storage tank may not be 77°F is—

$$Q_{dm} = Q_{da} + Q_{HWD}$$

6.1.7. Energy Factor. The energy factor, E_f, is computed as—

$$E_f = \sum_{i=1}^{6} \frac{M_i C_{pi}(135°F - 58°F)}{Q_{dm}}$$

where Q_{dm} is the modified daily water heating energy consumption as computed in accordance with Section 6.1.6, Btu

6.1.8. Annual Energy Consumption

The annual energy consumption for storage type and heat pump water heaters is computed as—

$$E_{annual} = Q_{dm} * 365$$

where Q_{dm} is the modified daily energy consumption value, Btu per day and 365 is the number of days within a year, days

6.2. Instantaneous Hot Water Heaters.

6.2.1. *First Hour Rating Computation.* Compute the first hour rating as

$$F_{hr} = \frac{M(\bar{T}_{del} - \bar{T}_{in})}{\rho(135°F - 58°F)}$$

which may be expressed as—

$$F_{hr} = \frac{M(\bar{T}_{del} - \bar{T}_{in})}{\rho(77°F)}$$

where M represents the mass removed during the one hour continuous draw, lbm

$\bar{T}_{del}$ is the average delivery temperature, °F

$\bar{T}_{in}$ is the average inlet temperature, °F

and ρ represents the density of water at the average delivery temperature, lbm/gal

If a water meter is used in lieu of a scale the first hour rating is computed as—

$$F_{hr} = \frac{V(\bar{T}_{del} - \bar{T}_{in})}{77°F}$$

where V represents the volume of water removed during the one hour continuous draw, gal

6.2.2. Recovery Efficiency

6.2.2.1. *Fixed Input Instantaneous Water Heaters.* The recovery efficiency is computed as

$$\eta_r = \frac{M_1 C_{p1}(\bar{T}_{del,1} - \bar{T}_{in,1})}{Q_r}$$

where M_1 is the mass withdrawn during the first draw, lbm

C_{p1} is the specific heat of water at the average temperature $(\bar{T}_{del,1} + \bar{T}_{in,1})/2$, Btu/lbm°F

$\bar{T}_{del,1}$ is the average delivery temperature for the first draw, °F

$\bar{T}_{in,1}$ is the average inlet temperature for the first draw, °F

and Q_r is the total energy used by the water heater between cutout prior to the first draw and cutout following the first draw, including auxiliary energy such as pilot lights, pumps, fans, etc., Btu

6.2.2.2. Variable Input Instantaneous Water Heaters

For instantaneous water heaters which have a variable firing rate, two recovery efficiency values are computed, one at the maximum input rate and one at the minimum input rate. The recovery efficiency used in subsequent computations is taken as the average of these two values. The maximum recovery efficiency is computed as

$$\eta_{r,max} = \frac{M_1 C_{p1}(\bar{T}_{del,1} - \bar{T}_{in,1})}{Q_{r,max}}$$

where M_1 is the mass withdrawn during the first draw, lbm

C_{p1} is the specific heat of water at the average temperature $(\bar{T}_{del,1} + T_{in,1})/2$, Btu/lbm °F

$\bar{T}_{del,1}$ is the average delivery temperature for the first draw, °F

$\bar{T}_{in,1}$ is the average inlet temperature for the first draw, °F

and $Q_{r,max}$ is the total energy used by the water heater between cutout prior to the first draw and cutout following the first draw, including auxiliary energy such as pilot light, Btu

The minimum recovery efficiency is computed as—

$$\eta_{r\text{-}min} = \frac{M_4 C_{p4}(\bar{T}_{del.4} - \bar{T}_{in.4})}{Q_{r\text{-}min}}$$

where M_4 is the mass withdrawn during the fourth draw, lbm
C_{p4} is the specific heat of water, Btu/lbm °F
$\bar{T}_{del.4}$ is the average delivery temperature for the fourth draw, °F
$\bar{T}_{in.4}$ is the average inlet temperature for the first draw, °F
and $Q_{r\text{-}min}$ is the total energy consumed immediately prior to the fourth draw and cutout following the fourth draw, including auxiliary energy such as pilot lights, Btu

The recovery efficiency is computed as—

$$\eta_r = \frac{\eta_{r\text{-}max} + \eta_{r\text{-}min}}{2}$$

6.2.3. *Daily Water Heating Energy Consumption.* The daily water heating energy consumption, Q_d is computed as—

$$Q_d = Q$$

where Q is the energy used by the flow actuated water heater during the 24 hour simulated use test

A modification is needed to take into account that the temperature difference between the outlet water temperature and supply water temperature may not be equivalent to the nominal value of 77 °F (135 °F−58 °F). The following equations adjust the experimental data to a nominal 77 °F temperature rise.

The energy used to heat water may be computed as—

$$Q_{HW} = \sum_{i=1}^{6} \frac{M_i C_{pi}(T_{del.i} - T_{in.i})}{\eta_r}$$

The energy required to heat the same quantity of water over a 77 °F temperature rise is—

$$Q_{HW.77} = \sum_{i=1}^{6} \frac{M_i C_{pi}(135°F - 58°F)}{\eta_r}$$

The difference between these two values is—

$$Q_{HWD} = Q_{HW.77} - Q_{HW}$$

which must be added to the daily water heating energy consumption value. Thus, the daily energy consumption value which takes into account that the temperature rise across the storage tank may not be 77 °F is—

$$Q_{am} = Q_a + Q_{HWD}$$

6.2.4. *Energy Factor.* The energy factor, E_f, is computed as—

$$E_f = \sum_{i=1}^{6} \frac{M_i C_{pi}(135°F - 58°F)}{Q_{dm}}$$

where Q_{dm} is the daily water heating energy consumption as computed in accordance with section 6.2.3., Btu
M_i is the mass associated with the ith draw, lbm
C_{pi} is the specific heat of water computed at a temperature of (58 °F+135 °F)/2, Btu/lbm °F
$\bar{T}_{del.i}$ is the average delivery temperature for the ith draw, °F
and $\bar{T}_{in.i}$ is the average inlet temperature for the ith draw, °F

6.2.5. *Annual Energy Consumption.* The annual energy consumption for instantaneous type water heaters is computed as—

$$E_{annual} = Q_{dm} * 365$$

where Q_{dm} is the modified daily energy consumption, Btu per day
and 365 is the number of days within a year, days.

7. Ratings for Untested Models

In order to relieve the test burden to manufacturers who offer water heaters which differ only in fuel type or power input, ratings for untested models may be established in accordance with the following procedures. In lieu of the following procedures a manufacturer may elect to test the unit for which a rating is sought.

7.1. *Gas Water Heaters.* Ratings obtained for gas water heaters using natural gas can be used for an identical water heater which utilizes propane gas if the input ratings are within 10 percent.

7.2. Electric Water Heaters

7.2.1. *First Hour Rating.* If an electric storage type water heater is available with more than one input rating, the manufacturer shall designate the standard input rating and the water heater need only be tested with heating elements at the designated standard input ratings. The first hour ratings for units having power input rating less than the designated standard input rating shall be assigned a first hour rating equivalent to the first draw of the first hour rating for the electric water heater with the standard input rating. For units having power inputs greater than the designated standard input rating, the first hour rating shall be equivalent to that measured for the water heater with the standard input rating.

7.2.2. *Energy Factor.* The energy factor for identical electric storage type water heaters, with the exception of heating element wattage, may use the energy factor obtained during testing of the water heater with the designated standard input rating.

§ 430.31 [Amended]

4. Section 430.31, *Purpose and Scope,* is amended by adding the following sentence at the end of the section to read as follows:

* * * Basic models of covered products manufactured before the date on which an amended energy conservation standard becomes effective (or revisions of such models manufactured after such date and have the same energy efficiency or energy use characteristics) that comply with the energy conservation standard applicable to such covered products on the day before such date shall be deemed to comply with the amended energy conservation standard.

§ 430.32 [Amended]

5. Section 430.32, *Energy conservation standards and effective dates,* is amended by revising paragraph (d), and by revising the effective date of entry "2." in paragraph (e) to read "09/01/90." The revised paragraph (d) reads as set forth below:

* * * * *

(d) *Water heaters.*

The energy factor of water heaters shall not be less than the following products manufactured on or after the indicated dates:

Product class	Energy factor, as of Jan. 1, 1990	Energy factor, as of April 15, 1991
1. Gas Water Heater.	0.62−(.0019× Rated Storage Volume in gallons).	0.62−(.0019× Rated Storage Volume in gallons).
2. Oil Water Heater.	0.59−(.0019× Rated Storage Volume in gallons).	0.59−(.0019× Rated Storage Volume in gallons).
3. Electric Water Heater.	0.95−(.00132× Rated Storage Volume in gallons).	0.93−(.00132× Rated Volume Storage in gallons).

Note: Rated Storage Volume=the water storage capacity of a water heater, in gallons, as specified by the manufacturer.

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